AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Reg. U. S. Pat. Off.
Established 1902

Vol. 59 No. 21

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Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY
Chestnut and 56th Streets, Philadelphia, Pa.

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Owned by United Publishers Corporation, 239 West 39th Street, New York; ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President; C. A. MUSSELMAN, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, Mexico and U. S. Possessions, $3.00 per year; Canada, $5.00 per year; all other countries in Postal Union, $6.00 per year. Single Copies, 35 cents.

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Automotive Industries — The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

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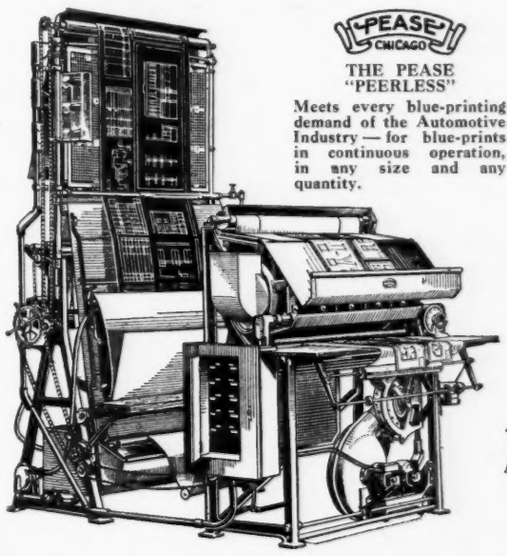

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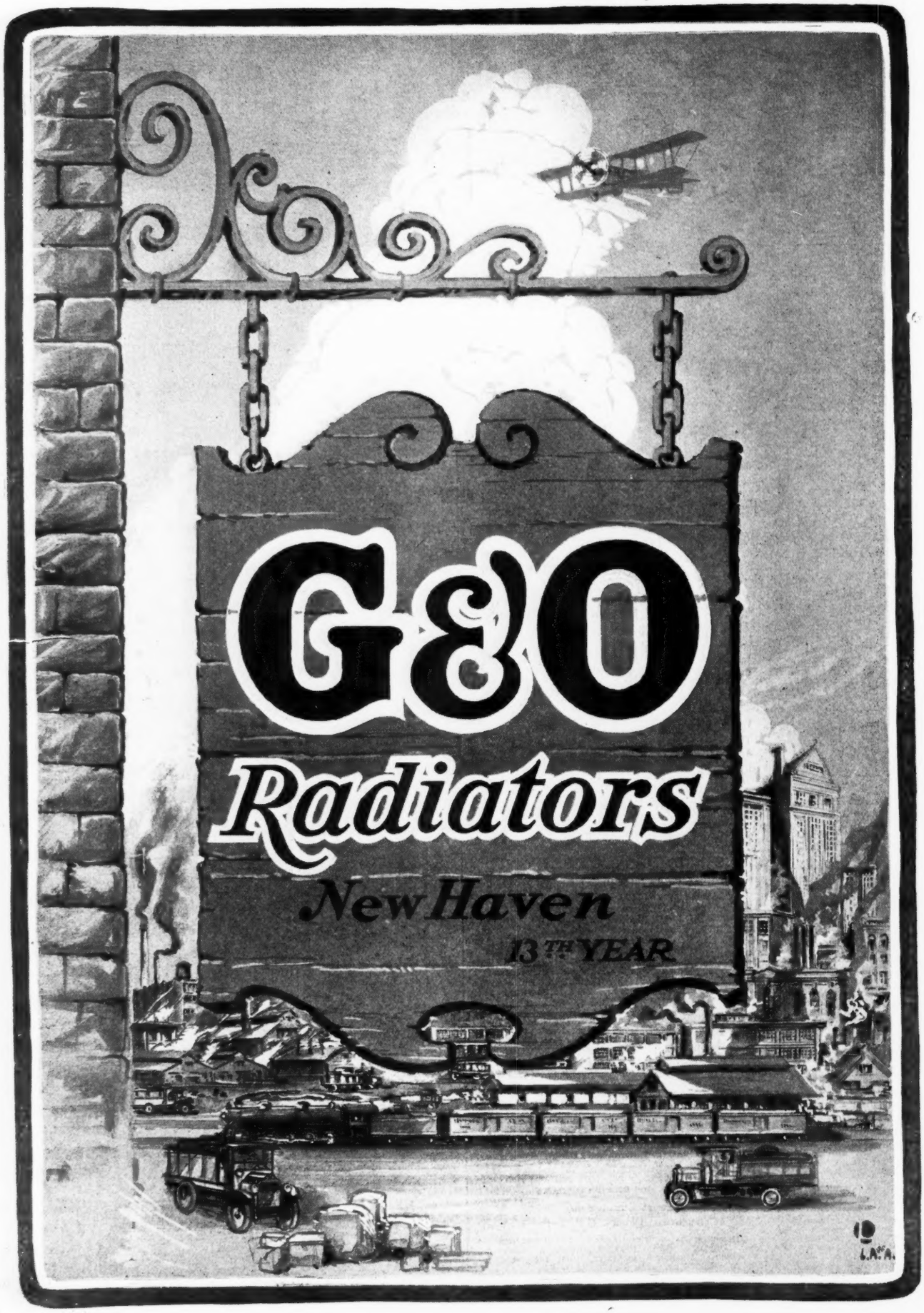
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AUTOMOTIVE INDUSTRIES
VOLUME 59 *Philadelphia, November 24, 1928* NUMBER 21

Future *of* British Show *Watched* With *Interest* Here

American industry beset with same merchandising problems which are causing English manufacturers to question advisability of continuing Olympia exhibits.

By John C. Gourlie

THE current agitation in Great Britain over the future of the Olympia Show is of interest to American manufacturers not only because most of them are exhibitors but also because a good deal of the discussion revolves about merchandising questions which are as alive here as they are abroad.

The matter is now under consideration by the Society of Motor Manufacturers and Traders, which will base its decision upon the canvassed opinions of members. Only two or three prominent men of the industry have referred to this subject in public, but in private conversations several have been most emphatic in condemning the annual show; some would have the show dropped entirely, though if the majority insist upon holding it in 1930, after allowing it to lapse next year, they will accept that compromise as an experiment.

Sir William Letts, referring to this matter at the banquet of the Motor Agents' Association, said that when he and Colonel Cole (the managing director of the Humber Co.) suggested a year ago that the show should be dropped for a year they found themselves without support, but that this year, upon raising the question again at a recent meeting of the society, they found many supporters. He freely admitted that the motor shows of the past had been the making of the British industry; of that there could be no doubt. But they could go on too long with a good thing, and under present conditions sales slumped in anticipation of what the show would bring to light in new models and prices.

Of course there is no question of the value of the American shows. They serve nationally and locally as periods when the attention of the public is focused on automobiles and the American skill in promotion of spectacles of this character enables the trade and industry to reap the full advertising and merchandising value of the exhibitions. Furthermore, the national shows serve the important purpose of bringing all elements of the industry together for association meetings, the easy transaction of business and the renewal of business acquaintances.

These considerations are not absent from the British discussions, and other points are being brought up which bear more or less upon the

Olympia Attendances Down

THE paying attendances at the 1928 Olympia Show, London, were lower than last year, for every one of the nine days as well as for the total. The figures for this and last year are given below. In explanation of the falling off it is said that fewer people visited the show from provincial centers, trade depression—especially in the North and Northwest—probably being the cause. Another reason put forward is that so many makers published full details of their programs before the show opened, while several of the largest have been delivering 1929 models since September.

Paying Attendances at Olympia Show

	1927	1928
Thursday	7,227	7,912
Friday	27,767	24,514
Saturday	45,940	41,251
Monday	26,195	24,177
Tuesday	28,210	25,762
Wednesday	35,887	30,743
Thursday	32,765	28,788
Friday	37,468	35,222
Saturday	33,763	34,898
	275,222	253,267

situation here. Sir Edward Manville (Daimler Co.) speaking also at the Motor Agents' dinner, while refusing to express a definite opinion on the matter at that time, said the dropping of the show, even for one year, was a move to be considered with great care; every side issue must be considered, for they might easily take a step they would live to regret. He said that the abandonment of the Paris Show for one year resulted in Great Britain becoming the center of the motor industry, and French makers had not been able to regain for their show the position it once held.

Revenue Would be Lost

Among the side issues referred to by Sir Edward may be included the large annual revenue which the Society of Motor Manufacturers (the organizing body) secures from the show; last year the net profit was nearly £53,000, or 73 per cent of the total revenue of the society. But for that there would have been a deficit in the year's accounts of roughly £12,000; as it was, the credit balance amounted to over £41,000, a large proportion of which will be available to the British manufacturers' and the importers' sections for propaganda or other purposes.

Then, too, the society has a contract with the owners of Olympia, and if the show were not held there would be no relief from the liability arising therefrom.

It would seem, therefore, that, however much the members of the society individually may favor dropping the show or holding it in alternate years, any cessation of the annual series would be detrimental to their collective interests.

Yet the thought persists that there must be some way out of the serious curtailment of buying experienced in the pre-show period. As an alternative to dropping the show or making it a biennial affair in England it is suggested that the exhibition be held in January each year, instead of October as of late, or November as originally. The show was put earlier three years ago in an attempt to shorten the dead period of car buying, but without having that effect. So as another experiment it is proposed to hold it at a later date to try to lengthen the seasonal buying.

A proposal that has been put forward in the Press with the object of extending the buying season is that British manufacturers and importers should agree to make all announcements of new models or price changes for the ensuing year on a given date or within a short predetermined period. The date or period should be just before the opening of the show and the latter should preferably be held in January, or as late as possible in the year, instead of in the early fall as in past years.

As things have been of late years, new models and prices have been announced by some makers as early as July; they have hoped thereby to induce sales of their next year's models at once, whereas the effect has been to make prospects hesitate and hold up their orders until they have seen what other makers would be offering, and they have not been able to know that until the show. A later show and later announcements of the following year's programs, it is considered, would defer the falling-off in sales until a time of year when the seasonal demand falls away naturally on account of weather conditions.

It is evident that the pre-show falling off in sales is more seriously regarded in Great Britain than in the United States. It is generally felt here that an early winter recession of major proportions in the retail market is inevitable, and would not be appreciably lightened by a different policy concerning new model announcements. But this question of when to make changes is beginning to receive more attention here, and in a few quarters is being most earnestly debated, along with a host of allied subjects fundamental to the distribution of automobiles.

Just now the tendency appears to be to spread new model announcements over the entire year. There is still a grouping of changes in the early summer, following the spring buying wave, and in the early winter, succeeding the fall spurt that has become characteristic of the market; but when the 1928 record is complete, it is likely that more announcements out of the regular seasons will be revealed than ever before.

Might End Waiting Periods

Perhaps this spreading of seasons of change serves to inure the public to the likelihood of new models and might perhaps in the long run put an end to periods when a large proportion of prospective buyers are awaiting the new announcements of the manufacturers. But there will probably always be a tendency to wait for what the shows will bring forth, and for any particular manufacturer a regular period of the year for new models is almost obligatory, if production programs are to be scientifically guided and dealer difficulties with old models kept at the minimum.

Regular times for new models have much to recommend them but have the outstanding disadvantage of producing a definite depression in the sales curve. Irregular or out-of-season announcements have been generally opposed in the past, but the current experiments

(Continued on page 766)

Mass Production Airplane Need

Development of replacement parts industry is also held essential in promoting further growth of aerial transportation.

By Lewis C. Dibble

PROBABLY one of the greatest factors which will enter into the future development of aviation will be the application of quality—mass production methods similar to those which have made it possible to place millions of automobiles in the hands of the people at reasonable costs."

Considerable significance attaches to that statement because it comes from one of the keenest analytical minds in industry. It represents the conclusion that has been reached by a man who holds an outstanding record of accomplishments both in the field of automotive manufacturing and banking and who is now turning his attention to aircraft. The statement was made during the discussion of future aviation possibilities with William Robert Wilson, chairman of the board of the recently organized Great Lakes Aircraft Corp., which has acquired the manufacturing properties and patents of the Glenn L. Martin Co., of Cleveland.

William Robert Wilson

"To a certain extent the airplane industry is in the same position today as the automotive industry was during its earlier years of development," Mr. Wilson said. "While much modern machinery is being used in making airplanes there is far too much hand work. Hand work is not only very expensive but the accurate results which come from precision volume production methods are not obtained."

"Mass production methods in airplane construction," he continued, "are needed for two very definite reasons. They are necessary, first, as a means of reducing the production cost of planes, and this will come in for unusual development because competition, like that which developed the automobile industry, will force it. Secondly, precision mass production methods will be necessary from the standpoint of establishing a source of reliable interchangeable replacement parts. As matters stand today there is great room for development in the industry in working out the ways and means in which replacement parts will be made easily available to users of aircraft.

"In the earlier days of the automobile, owners sometimes had to lay their machines up for days at a time while waiting for shipment of parts from the factory. Development of the parts industry became one of the most important branches of the automotive industry. When parts became available in any section of the country a great stimulus to automobile sales resulted, for the public soon came to realize that laying up a vehicle for considerable stretches of time for repairs was not necessary.

"What the automobile industry has gone through in supplying car owners with parts will also have to be experienced by the aircraft industry. It may not be handled in identically the same manner, though it is common knowledge that much study regarding the possibilities of the airplane parts field is now being made by several different agencies. If airplane manufacturers are wise they will not wait for outside sources to develop this function, but will step in early and firmly establish convenient parts supplies for plane owners. In so doing they will take a very constructive step and one that is bound, more than anything else, to increase the use of airplanes."

"The aviation industry impresses me as being in a period that compares well with what the automotive

industry went through between the years of 1907-12," Mr. Wilson went on. "During those years the automotive industry began to take definite form and from the developments in those years it has grown along a rather definite course to its present position. There probably will come a day in the aircraft industry when the various companies will be shaken down and manufacturing compacted. We want to build our company so permanently and well that it will be a permanent factor in the business."

IN 1925, Mr. Wilson points out, aircraft production in the United States consisted of 711 land planes and 78 seaplanes, and the total value of all aircraft products for the year was estimated at $12,524,719.

Last year the production was 1857 land planes and 105 seaplanes and the output was valued at $20,783,733.

This year production is expected to exceed $39,000,000.

Mr. Wilson paused long enough to produce an abundance of facts and figures on the aircraft industry, and, analyzing them as one might a financial statement, he pointed out why great things are to be expected from aircraft development.

"Statistics which have been gathered by the Department of Commerce prove more than anything else the forward trend in aviation," said Mr. Wilson. "Output of aircraft products is growing by leaps and bounds. In 1925, for instance, there were 711 airplanes and 78 seaplanes made in the United States and the total value of aircraft products for the year was estimated at $12,524,719. In 1926 airplane production increased to 1125 and 61 seaplanes were manufactured. Total value of aircraft products for the year was $17,694,905. Again in 1927 a remarkable increase is noted with 1857 airplanes and 105 seaplanes being produced. Total value of products for last year was $20,783,733. While figures for this year are not available it has been estimated by certain statisticians that the total value of aircraft products may mount to more than $39,000,000."

Mr. Wilson was asked just what he expects aviation of the future to amount to as an industry.

Question Difficult to Answer

"I wish I held the answer to that question," he replied. "To make a prediction now on what the future of this business holds would be difficult. For years certain people have been predicting the automobile business was reaching the saturation point, but that condition still appears to be quite far off. Perhaps the same situation will apply to aviation. Aviation is just getting away from its infancy stage and I like to think that the future position it will hold will be determined almost entirely by the practical transportation possibilities it offers to the public. As I see it, these possibilities are going to cover an ever-widening field. It is my opinion that aviation, within limits, will take its place in the years to come as one of the greatest industries of its time.

"The activities of the Glenn Martin Co., heretofore, have been to supply its planes to the military exclusively. This has offered an excellent field, and while this market will be an ever-growing one, I like the expression made the other day by William P. MacCracken, Jr., Assistant Secretary of Commerce for Aviation, when he said, 'The big field in aeronautics is supplying the commercial demand and not the military in times of peace.'

"To illustrate his point Mr. MacCracken told of an interesting occurrence which I might repeat. Just three years ago Mr. MacCracken asked Glenn L. Martin if he, as a matter of example, would attempt to purchase all the commercial aviation in the country for $5,000,000. Mr. Martin replied that he thought the sum would acquire all the commercial and a portion of the military besides. Today Mr. MacCracken doubts if Mr. Martin would want to attempt to buy the commercial aviation alone for $125,000,000. My idea in reciting the story is to bring home my point that we are in a great business. It is a business that is growing even more spectacularly than did the automobile business in its early expansion days.

Why Company Was Acquired

"Some have asked why we came to acquire the Glenn L. Martin properties as the beginning of our operations. There are several good reasons. It impressed us as a company with a fine technical background. Glenn L. Martin is a splendid engineer and a pioneer in aircraft development. It is a company with character and a substantial background. The properties in Cleveland comprise, besides a modern production plant, a splendid landing field and, what is more, adequate additional space for manufacturing growth in the future. Added to this is a body of 1100 men comprising some of the best craftsmen which we will have as a nucleus for building up a splendid personnel.

"Previous to our acquiring the plant Mr. Martin specialized in building planes for the United States Navy. We are happy to announce that we will expand the field of possibilities for the company and we are going to enter the commercial aviation field actively. The fact that Mr. Martin, who is going to build a new plant for his company at Baltimore, will continue to function with the Cleveland company in an advisory engineering capacity, makes us feel that we are getting off on a sound and substantial footing."

Asked what type of commercial plane the company expects to produce, Mr. Wilson said that Mr. Martin favors the 6-8 passenger plane which is adaptable to mail and passenger use or mail and mail distribution, explaining what is meant by the latter classification.

"If you delve back into the history of the early days

of our mail service you will find some interesting facts," said Mr. Wilson. "Back in the days when mail was first being carried on trains the mail was sorted before it was placed aboard the train. This wasted much valuable time and finally led to the evolution of the mail car whereby mails were sorted en route. This same condition applied to air mail today. While much valuable time is being saved in the air, a large amount of time is being lost on the ground in sorting. If the air mail could be handled just the same as regular mail is today we could save much time and greatly increase the efficiency of air mail. With that idea in mind we intend to build a plane having all the facilities of the rail mail car whereby mail would be sorted in the plane by a clerk while en route. I believe it will go a long way toward increasing the efficiency of air mail.

Package Express Has Future

"There is another thing the air mail has accomplished. It has demonstrated to the public in a practical way the time-saving effected in mail transmission and in so doing has prepared the public mind for the package express, which I feel is another big field in aviation which is just around the corner. Already we have a limited number of planes engaged in carrying express. Its further development offers untold possibilities.

"The range of possibilities of planes among corporations for corporation work is another factor that is going to facilitate the airplane business. This was very ably illustrated the other day by Otto Jackson, vice-president of the Standard Oil Co. of Indiana, who declared that eight of the nine members of his board of directors who have used a large tri-motored plane purchased some months ago have flown collectively approximately 100,000 miles. One does not need to stretch the imagination one bit to realize the potential and substantial market that will open up from companies conducting business on a national scale.

"Here we have a conservative company like Standard Oil utilizing an airplane to transport its executives on business. It has made cross-country trips of hundreds of miles a matter of a few hours' ride by air. Instead of the directors being on the road a month to visit various important operations located in the many states they recently demonstrated that the job could be easily done in a week's time. Think what this means. Here are men whose time can hardly be measured in dollars and cents. Hours saved in travel means an intrinsic saving to Standard Oil of many times the cost of airplane operation. Standard Oil is so elated over its results that it is ordering an additional ship. What the airplane has done for Standard Oil I am sure it is going to do for any number of other large companies enjoying national or international operations.

"Statistics show us that there are approximately 8500 individually-owned planes in the United States today. In this same classification it is estimated there are no more than 1000 planes for the rest of the entire world. With the ever-increasing number of airports and flying conveniences it is reasonable to assume that this classification of ownership is bound to enjoy a great growth. While I do not believe the airplane is by any means going to replace the automobile in this classification I am firm in my belief that this field opens up possibilites difficult to thoroughly visualize at the present time.

"There are other great fields for the airplane. It is useful in forest patrol, aerial survey, for plant dusting and for advertising. The accomplishments of the planes engaged in forest patrol are writing a brilliant new page in flying history. The work that has been done in plant dusting has attracted great interest. It has been said that dusting operations can be conducted more economically with the use of the airplane than with the conventional ground methods. This activity is likely to come in for closer scrutiny from our agricultural colleges and it will not be surprising to see the airplane quite generally adopted as the ultra-modern tool of the farmer for this type of work.

"Marked strides are being made in building airplanes substantial enough to undergo many hours in the air before an overhaul is necessary. There wasn't a motor built a few years ago reliable enough to keep a ship in the air for sustained periods of time. Trends along this line are changing rapidly. This was forcefully demonstrated to the public best through Col. Charles Lindbergh's great accomplishments. His ship covered nearly 50,000 miles with but few repairs before it was retired. The record stood out as a new accomplishment but it will soon fade. Engineering progress will see to that. Planes of today are very reliable. They are but a forerunner of what we are to expect in aviation."

A graduate of Hyde Park High School in Chicago, Mr. Wilson entered Armour Institute where he took a degree of Bachelor of Science and also in advanced Mechanical Engineering. While he never followed his profession as an engineer, his education, no doubt, helped him to become one of the best business analysts the automotive industry has produced.

In 1911 Mr. Wilson first became associated with things automotive when he went to Detroit as assistant to Clarence H. Booth, who later became general manager of the automobile division of the Studebaker Corp. of America. His training with Studebaker gave him a keen insight into the automotive picture and in 1913 he went to Dodge Brothers, where he was intrusted with complete responsibilities attendant upon their entrance into the automobile business. This connection continued until 1918 when he went to New York to become vice-president of the Irving National Bank.

Took Charge of Maxwell

It was nearly three years later that his friend, Walter P. Chrysler, became interested in the management of the Maxwell Motor Car Co., and upon Mr. Chrysler's invitation he left his banking connection to take charge of the reorganization of Maxwell as its president.

In 1925 he became president of the Guardian Trust Co. of Detroit, which he was instrumental in organizing. At the same time the Guardian Detroit Co. was organized, and the Guardian Detroit Bank about a year later. These institutions soon became one of the most powerful banking groups in the Motor City.

Manufacturing activities again attracted Mr. Wilson during his administration of the affairs of the Murray Body Corp. as special receiver, and in 1927 he resigned his banking connections to become chairman of the board and president of the Murray Corp. of America during its reorganization. The job Mr. Wilson accomplished at Murray forms another bright chapter. When he took hold in 1927, Murray, under conservative accounting, made a profit of approximately $257,000. He completely reconstructed the entire organization, and it is estimated that in 1928 the corporation, from which he resigned only a few weeks ago, will make approximately $2,000,000. Besides putting Murray on a profitable basis, Mr. Wilson also set up a production record which is unusual in the annals of body building, by turning inventory on an average of 14 times a year.

In addition to his connection as chairman of the board of the Great Lakes Aircraft Corp., he is also chairman of the board of Copeland Products, Inc., one of the five leading manufacturers of electric refrigeration.

Chrysler Gets Efficient

Operators and foremen held directly responsible for upkeep and failures cause wage loss.

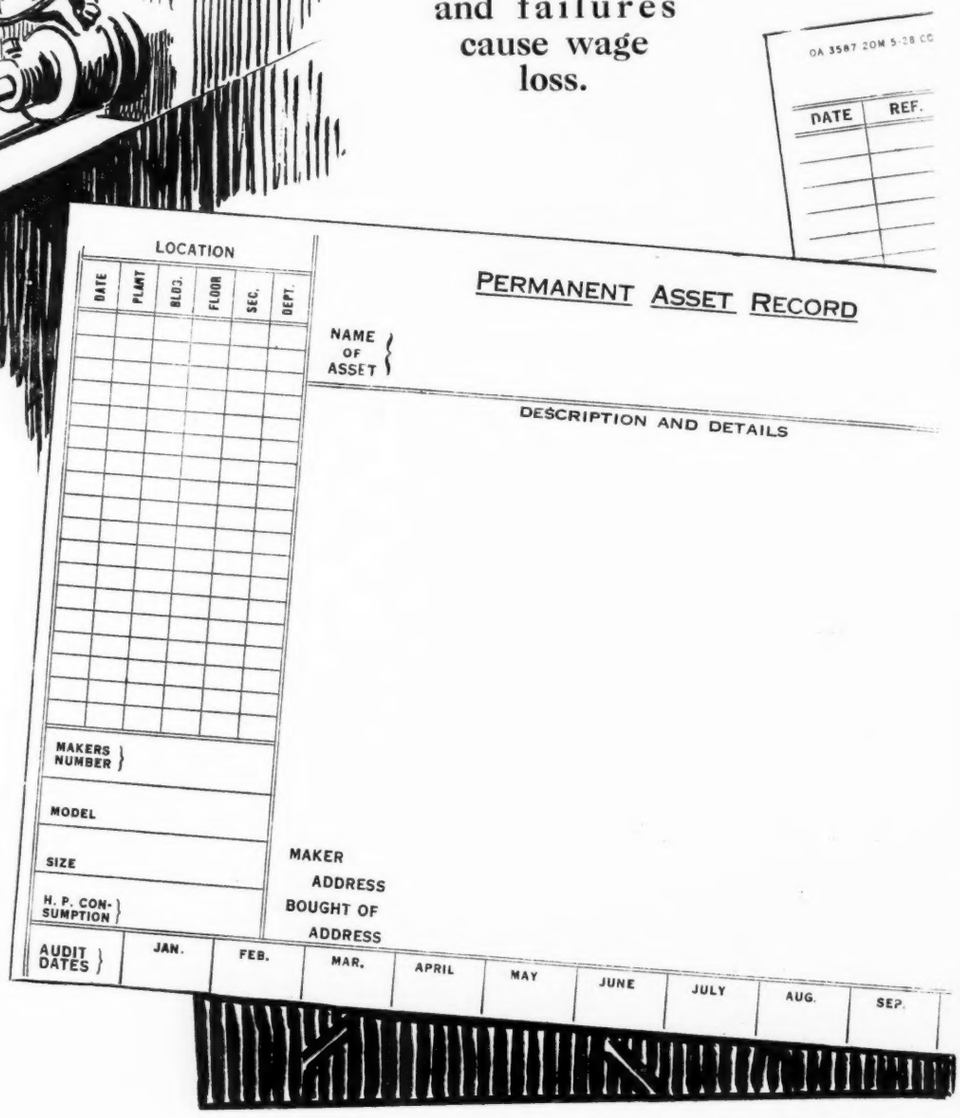


Fig. 1—Front of Permanent Asset Record card on which is carried complete information about the piece of equipment concerned. One of these cards is provided for each machine tool in the plant

PROPER maintenance of plant and equipment in automotive factories, and particularly the repair and upkeep of machine tools, presents a highly complicated problem which can be and is handled in many different ways. In fact, the methods employed are about as numerous as the plants in which machine tools are used.

Through all the successful maintenance plans employed, however, run certain fundamental ideas upon which the particular practices are based. Foremost among these considerations is the one that production must not be held up under any circumstances. While this ideal may seldom be achieved, at least over long periods, it is the ultimate goal toward which all successful maintenance organizations are consciously or unconsciously heading.

The second most important element in the determination of maintenance policies is the item of cost and it is the various interpretations placed upon the influences of this factor which lead, usually, to such wide divergences in detail maintenance methods.

At one extreme one finds the organization which has stand-by equipment for practically all the machine tools in the plant. When a tool breaks down production is immediately switched to the reserve equipment and the repair work can be done without undue haste and as it is convenient. Under such a plan preventive maintenance work need not be particularly thorough since the bogey of a shut-down production line has been effectually eliminated, but the added initial investment in equipment and the increased carrying costs resulting make the ultimate economies of this plan sufficiently questionable so that it has been by no means generally adopted.

At the other extreme one finds the plant which carries no spare equipment but depends entirely upon

Machine Tool Maintenance

By K. W. STILLMAN

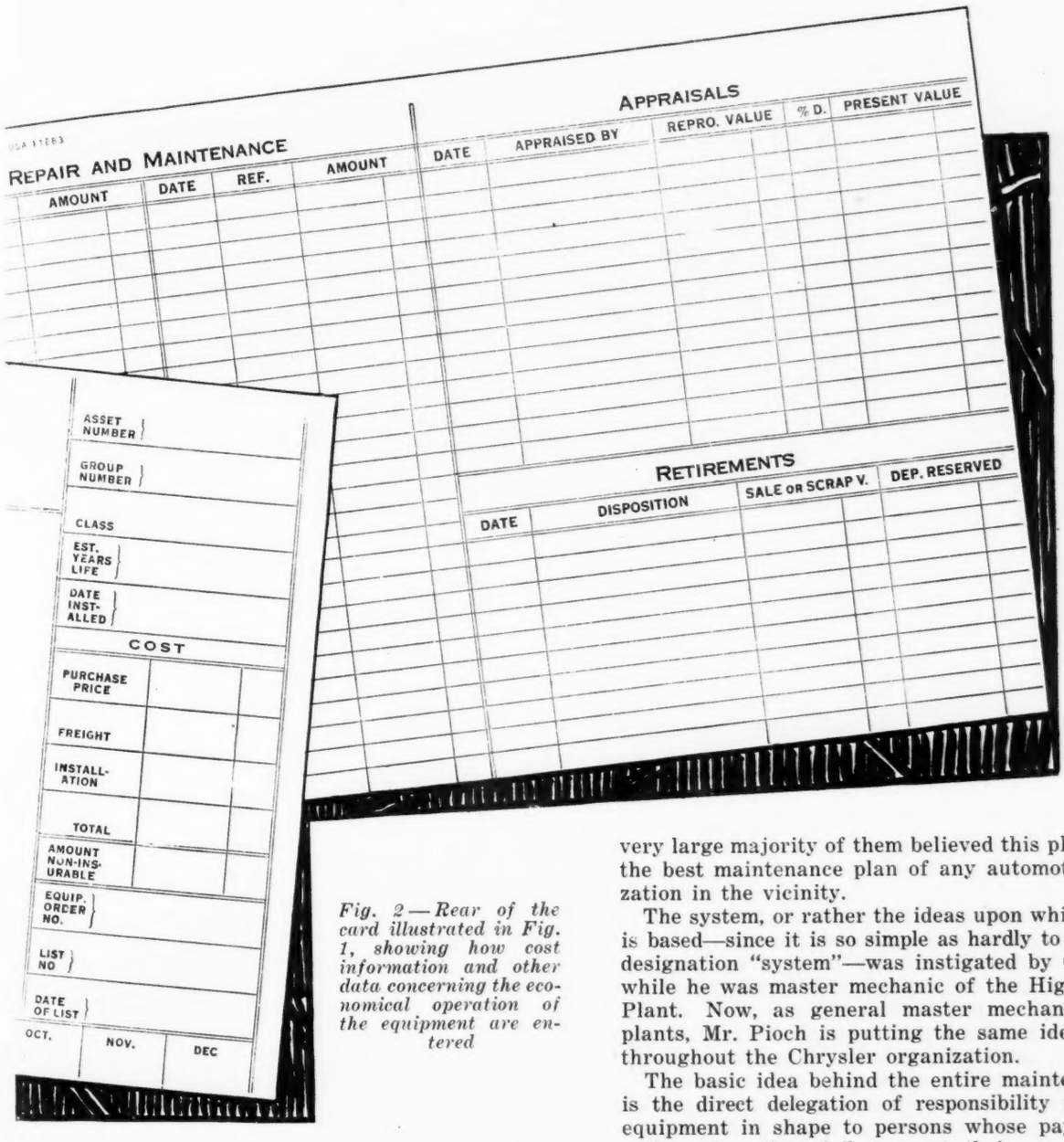


Fig. 2—Rear of the card illustrated in Fig. 1, showing how cost information and other data concerning the economical operation of the equipment are entered

the efficiency of the maintenance department to keep the machine tools operating. Under such conditions a machine tool breakdown means a halt in the productive processes, and preventive maintenance work of a highly organized nature must be conducted so that incipient failures may be discovered and attended to before actual failure occurs.

In the latter class is the maintenance system now in operation at the Highland Park Plant of the Chrysler Corp. It has operated so successfully that a survey of the Detroit service representatives of a large number of machine tool manufacturers indicated that a very large majority of them believed this plant to have the best maintenance plan of any automotive organization in the vicinity.

The system, or rather the ideas upon which the plan is based—since it is so simple as hardly to deserve the designation "system"—was instigated by C. E. Pioch while he was master mechanic of the Highland Park Plant. Now, as general master mechanic over all plants, Mr. Pioch is putting the same ideas to work throughout the Chrysler organization.

The basic idea behind the entire maintenance plan is the direct delegation of responsibility for keeping equipment in shape to persons whose pay envelopes suffer when they fail to meet their responsibilities. Many organizations have learned that the pocketbook nerve is one of the most sensitive in the human anatomy. The Chrysler plan simply applies this knowledge to securing full cooperation among all parties interested in machine tool operation in keeping the equipment in the best possible state of repair.

That the plan works is proved not only by the unbiased opinions of the service representatives mentioned before, but by a survey of Chrysler production records which show delays due to machine failures to be few and far between, although no stand-by equipment is provided for over 90 per cent of the machine

GENERAL WORKS AUTHORIZATION
CHRYSLER CORPORATION

DATE 2-28-28 Highland Park PLANT AUTH. NO. REQUEST NO. 36959

THIS AUTHORIZATION MUST BE OBTAINED FOR ALL NEW EQUIPMENT COSTING MORE THAN $50.00; REPAIRS MORE THAN $100.00 36959

WORK TO BE DONE BY Dept. 245 Plant 4 DEPT. NO. DATE TO BE COMPLETED

ENGINEERING CHANGE	NEW EQUIPMENT ADDITIONAL	NEW EQUIPMENT REPLACEMENT	PLANT LAYOUT ADDITIONAL FACILITIES	PLANT LAYOUT REARRANGEMENT	REPAIRS	COST REDUCTION		
						X		

DESCRIPTION OF EXPENDITURES, WHY NECESSARY WHAT ECONOMIES WILL RESULT, ETC

To cover cost of Machinery and Motor including Freight and Installation for both; also Fixtures and Tools for Brake Shoe Lining. Part 43009

Eng. Rel. 1051-Effective for Model 52-Q Approx. 5-15-28

Close Auth. July 15, 1928

MODEL "52-Q"

WHITE —TO C. W. O. DEPT.
BUFF —TO OFFICIAL REQUESTING WORK
YELLOW—TO MASTER MECHANIC
PINK —TO BE RETAINED BY OFFICIAL REQUESTING WORK
GREEN —TO OFFICIAL AUTHORIZING WORK

ESTIMATED COST		ACTUAL COST		REQUESTED BY	APPROVED BY
MAT'L	(	MAT'L		P. J. HUNT	
LABOR	) 3350.00	LABOR		APPROVED BY	APPROVED BY
TOTAL	3350.00	TOTAL			

AUTHORIZED BY AUTHORIZED BY

Fig. 3—General Works Authorization which must be made out and approved for all purchases of material costing over $50 and for repair jobs costing more than $100

tools regularly used in all kinds of production operations.

The most important consideration in keeping machine tools in good repair is to know definitely when any particular machine has outlived its usefulness and should be replaced by a new machine. The information necessary for making such a decision is available at all times for every single machine tool in the Chrysler plant, not only for periodic checks, but unsatisfactory conditions affecting any particular tool are brought automatically to the attention of the proper authorities.

This record is kept in a card file, a card being carried for each piece of equipment. The front face of the record card is shown in Fig. 1 while the reverse is illustrated in Fig. 2.

When a new machine is purchased a card is made out and, as shown in Fig. 1, it carries complete information about the tool, including its name and a description from whom it was purchased; the total cost, including freight and installation; its location in the plant, and similar items, all of which will assist later in estimating its further usefulness.

On the rear of the card record, as shown in Fig. 2, all information concerning the future activities of the tool is carried. Whenever any repair or maintenance work is performed on the machine the cost of the work is entered on the card with the date and order number under which the job was done. These repair costs are totaled annually so that the rising cost of repairs each year are readily available for comparison with the cost of a replacement machine whenever such a move is under consideration. One man spends his entire time in entering information on these records and he is instructed to call immediately to the attention of the master mechanic any piece of equipment which appears to be costing an excessive amount to keep in repair. When such a report is received the master mechanic and the tool design department investigate to determine whether the machine should be replaced or whether more expense is justified to keep it in the production line.

With the operation of these records assuring that inefficient equipment will be quickly detected, the next step in the maintenance program is to keep the machines in good operating condition. In this direction the policy has been adopted by Chrysler of equipping all large machine tools and all small tools where bearing pressures are high with automatic magazine lubrication.

It is recognized by all production men that faulty lubrication is the cause of a very large proportion of machine tool breakdowns and the Chrysler organization believes that magazine lubrication is the solution of this problem. Various types of lubricating systems are being tried out, not only on newly purchased tools but they also have been or are being installed on all older machines where the service warrants it.

Where excessive bearing pressures are not present or there are not a large number of places to be oiled, nor any great difficulty in reaching the oil cups, magazine systems may not be warranted. But even in such cases lubrication is being made simpler and more sure by providing larger oil cups and reservoirs so that a single application of lubricant will last for much longer periods than is usually the case.

Operator and Foreman Responsible

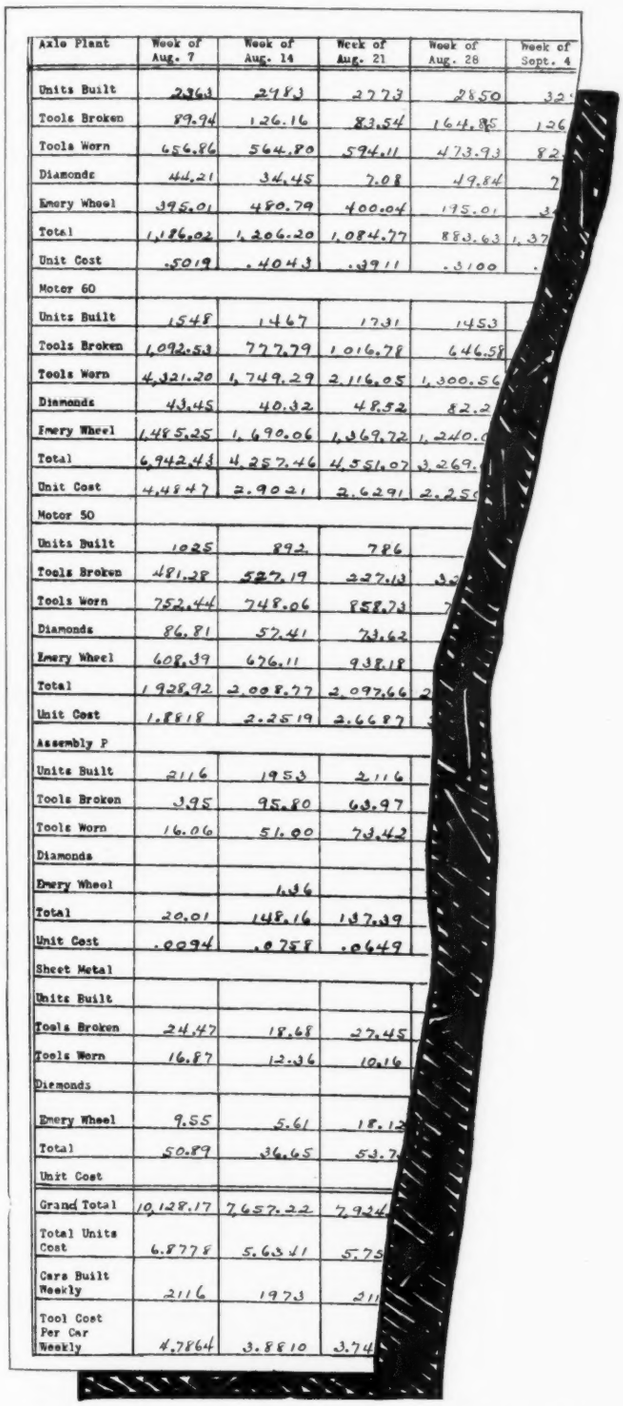
Full responsibility for keeping his machine properly lubricated is vested in the operator and his foreman. They also are responsible for reporting any unsatisfactory conditions in the operation of the machine which may indicate incipient failures. Periodic inspections are made by maintenance department experts but these do not relieve the machine operators and foremen in any way of their responsibility for the condition of their machine tools.

While this plan is not unusual it is made really effective at the Chrysler plant because all the machine tool operators are paid by means of a group bonus plan. If a machine breaks down the operator loses money. He is paid straight day wages while his machine is out of commission but the difference between his day wages and what he earns under the group bonus plan is so great as to make frequent or long periods of day-work pay unpleasant.

In addition to his own losses, moreover, stoppage of his machine lowers the production of the group of which he is a member so that all his companions also lose money while his machine is down. One doesn't need any evidence to know that under these conditions the other members of the group will not hesitate to make known their opinion of an operator who per-

mits a breakdown through carelessness or inattention to lubrication.

A new machine tool operator entering a group very quickly learns to give his equipment every requisite attention to keep it in the best operating condition and to report all incipient failures so that they may be taken care of before actual breakdown occurs. If this is not learned quickly the new man usually finds various reasons for leaving the group, the other members of which cannot afford to carry any deadheads or careless workmen whose negligence cuts into the group pay and is felt in individual pay envelopes.



Axle Plant	Week of Aug. 7	Week of Aug. 14	Week of Aug. 21	Week of Aug. 28	Week of Sept. 4
Units Built	236.3	248.3	227.3	285.0	32
Tools Broken	89.94	126.16	83.54	164.85	126
Tools Worn	656.86	564.80	594.11	473.93	82
Diamonds	44.21	34.48	7.08	49.84	7
Emery Wheel	395.01	480.79	400.04	195.01	3
Total	1,186.02	1,206.20	1,084.77	883.63	1,37
Unit Cost	.5019	.4043	.3911	.3100	.
Motor 60					
Units Built	1548	1467	1731	1453	
Tools Broken	1,092.53	727.79	1,016.78	646.58	
Tools Worn	4,321.20	1,749.29	2,116.05	1,300.56	
Diamonds	43.45	40.32	48.52	82.2	
Emery Wheel	1,485.25	1,690.06	1,369.72	1,240.0	
Total	6,942.43	4,257.46	4,551.07	3,269.	
Unit Cost	4.4847	2.9021	2.6291	2.25	
Motor 50					
Units Built	1025	892	786		
Tools Broken	481.28	527.19	227.13	3	
Tools Worn	752.44	748.06	858.73	7	
Diamonds	86.81	57.41	73.62		
Emery Wheel	608.39	676.11	938.18		
Total	1928.92	2,008.77	2,097.66	2	
Unit Cost	1.8818	2.2519	2.6687	3	
Assembly P					
Units Built	2116	1953	2116		
Tools Broken	3.95	95.80	63.97		
Tools Worn	16.06	51.00	73.42		
Diamonds					
Emery Wheel		1.36			
Total	20.01	148.16	137.39		
Unit Cost	.0094	.0758	.0649		
Sheet Metal					
Units Built					
Tools Broken	24.47	18.68	27.45		
Tools Worn	16.87	12.36	10.16		
Diamonds					
Emery Wheel	9.55	5.61	18.12		
Total	50.89	36.65	53.7		
Unit Cost					
Grand Total	10,128.17	7,657.22	7,924		
Total Units Cost	6.8778	5.6391	5.75		
Cars Built Weekly	2116	1973	211		
Tool Cost Per Car Weekly	4.7864	3.8810	3.74		

Fig. 4—Weekly record sheet of small tool costs whose distribution brought about major economies in tool expense

Each foreman in the plant is held directly responsible for the output and expenses of his department. His remuneration and his prospects for advancement depend upon the records made by his organization. So he also is personally interested in keeping his equipment in such shape that the maximum output with the minimum expense can be maintained and gives his full cooperation to the maintenance department and demands it from all his workmen to this end.

Weekly tabulations are made by the foreman of all trouble with equipment either noticed by the foremen or reported by the machine operators. These are forwarded to the master mechanic, who has all the reports investigated. These weekly reports never cover actual breakdowns but concern unsatisfactory operating conditions, which in many cases, if not attended to directly, might result in actual failure of the equipment.

Failures Largely Eliminated

When actual failures of a machine do occur the maintenance department is notified directly and repair work is started at once, but the large amount of preventive work made possible by the weekly reports eliminates all but a very small proportion of failures which might reasonably be expected to take place under the rather severe operating conditions at the Highland Park plant.

Repair work which is estimated to cost less than $100 is performed on a regular shop work order. For major repairs costing more than $100 and for the purchase of new equipment costing more than $50 an authorization like that shown in Fig. 3 must be made out and approved by various factory officials, but the repair work is not delayed for this approval.

Based upon their own experience with maintenance departments, some readers might question the efficacy of the weekly reports mentioned before in getting action from the maintenance men. At the Chrysler plant they do get results and for an all-sufficient reason based again on the sensitiveness of the pocketbook nerve. Whenever a machine breaks down for whatever cause the maintenance department is charged with the productive loss of the machine and the master mechanic must sign day rate allowance slip for the day rate wages of the operators left without work while the machine is idle.

The maintenance department, like all others, operates on a budget and must show profitable operation so it is just as eager as the production departments to keep the equipment in good operating condition and much prefers to prevent a breakdown rather than to repair one after production has been stopped. By this means the fullest measure of cooperation is obtained between the productive and repair departments and the latter make use of every available bit of information from the former concerning machines which are not operating satisfactorily and may fail.

Furthermore, when one of the very few breakdowns does occur no special pressure is required to get the utmost service from the repair department in getting the machine back into production, for it is costing the department money for every minute the machine is out of production.

If an assembly conveyor breaks down, for example, it may throw upwards of 250 men out of work temporarily and while the conveyor is down the day rate wages of these 250 men is being charged against the

maintenance department. Under such circumstances it is, possibly not surprising that some unusual records for repair work have been made by the Highland Park organization.

This idea of fixing responsibility where it will do the most good is carried out to the limit. If one of a battery of 50 machines breaks down the obvious reaction in many maintenance departments would be that no haste was required in repairing it since the remaining 49 machines could easily take over the extra load. At the Chrysler plant, however, regardless of whether the load could be carried by the other machines, the maintenance department is charged with the productive loss from the single impaired machine as long as it is out of production. The maintenance department is even more anxious than the production department, if possible, to get the machine back into production, so that the antagonism which often prevails between the two departments is conspicuously absent.

This is all there is to the Chrysler maintenance plan and it has the prime virtue of simplicity. The entire process has been based upon an ideal which, unfortunately under some aspects of modern management, has been somewhat relegated to the rear—that of giving a man a job and then letting him run it, judging his worth by his results.

No elaborate system of forms is used; foremen do not spend most of their time making out reports; detail records are kept at a minimum. But each department is given certain direct responsibilities and is held strictly accountable for its results. By proper choice of how the responsibility for machine tool repair should be divided the fullest possible measure of cooperation is obtained among the interested parties so that the final results, obtained in an admirably simple fashion, are such which any organization might be proud of.

Another very interesting Chrysler practice which, while not being directly related to machine tool maintenance, illustrates again the possibilities latent in the delegation of responsibility, is that of small tool control.

Several years ago the plan was instigated of having each small tool crib throughout the Highland Park plant report weekly the number of small tools broken or worn out during the week. These items were priced, were expressed in terms of dollars per unit produced by the department during the period and were distributed to the various department and division heads by the master mechanic.

No particular campaign was started to reduce small tool costs but each week each foreman and superintendent received a copy of report shown in Fig. 4, which carried the record of small tool costs for his department or division as compared with that of other departments and the plant as a whole.

After two years of these weekly reports the average small tool cost has dropped about 80 per cent per car and is still going down.

Acetylene Welding in Automobile Body Production

AT the annual meeting of the International Acetylene Association in Chicago, the Oxy-Acetylene Committee made a report covering recent developments in connection with various items of equipment used in oxy-acetylene welding and the use of such welding in different industries.

In order to show the extent of the use of oxy-acetylene welding in all-steel automobile body production, the purchases of oxygen of a particular company, expressed as a percentage of its total business, are given for a number of years from 1913 on. The percentages would, of course, be considerably higher if all purchases of welding material and equipment had been included, such as carbide, dissolved acetylene, filler rod, welding goggles, pressure hose, new equipment, replacement parts, etc. All of the oxygen purchased was used in oxy-acetylene welding, hence the amounts spent for oxygen give a fair idea of the application of the process:

Year	1913	1914	1918	1919	1923	1924	1927
Per Cent	0.51	0.50	0.30	0.31	0.34	0.30	0.23

These figures show that there has been a slight decline in the use of the process in this particular line. While the decline is very slight on the total consumption comparison, the actual percentage of reduction on the final plant production amounts to approximately 28 per cent. There being a reduction of 28 per cent in the use of oxy-acetylene welding in the production departments and one of only 0.07 per cent in the plant as a whole, it follows that the use of the process in other departments must have increased.

The process has proved of greatest advantage in the final assembly department. The body is produced in units which are placed in a final assembly jig, from which it emerges as a complete body. All of the vital parts are welded in perfect alignment by the oxy-acetylene process, this having proved the quickest and best method. Moreover, the parts are easily reached for the application of this process. The parts which are not vital to alignment are allowed to pass from the assembly jig unwelded, and are later welded on the finishing line conveyors. Where the supply of work to the welder depends on the speed of the conveyor, close supervision is very essential.

Following is a quotation from an interdepartmental letter sent out by the management of a well-organized plant, urging the supervisors to produce the maximum results from the materials consumed:

"The welding operators on conveyor No. 9, column 62: Total gas cost at this point amounts to $0.92 per hour, by two men, or $0.46 each man. The total time required for each man to complete the operation is 1 minute and 10 seconds. The conveyor is traveling at a speed of 36 pieces per hour or one piece each minute and 40 seconds. The operator hurries and completes his welding and stands with lit torch for the remaining 30 seconds until the next piece could be worked on.

"Please note the amount of money than can be saved from the following:

"The present cost of gases is $0.46 per hour each operator. A smaller tip consuming $0.179 worth of gases it is found completes this operation in 1 minute and 30 seconds and produces a considerably neater job.

"The money saving in this case is $0.28 per hour per man or a total of $5.60 per 10 hours for 2 men."

The cost of oxygen consumed in plant maintenance and repair, in all departments except those of actual production, increased from 5.7 per cent in 1920 to 13 per cent in 1925, to 20 per cent in 1927, the basis of comparison evidently being the total cost of maintenance and repairs of these departments.

Just Among Ourselves

Facts Needed to Promote Marketing Efficiency

APPLICATION of production efficiency methods to marketing has been talked about in generalities in this automotive industry of ours for several years now. While a certain amount of progress has been made by individual companies, the general procedure so far as the whole industry is concerned still remains largely in the conversational stage. The chief obstacle still in the way of greater progress is lack of available facts, similar to those specific facts the study of which has made possible the much-talked of production economies. Perhaps the facts for marketing analysis never can be quite so definite and concrete as those involved in production work. But that is all the more reason for striving to obtain the facts and then by some means or other make them available for broad-gage analysis.

* * *

Free Exchange of Data Would Help Every One

MANY facts already have been and are being collected currently which serve only a part of their potential function for usefulness because of the continued hesitancy about the exchange of marketing information among competing companies. Until that hesitancy becomes far less pronounced than it is at present, much of the attempt to eliminate waste in marketing bids fair to remain in the field of theory rather than practice. We talk of waste in consumer advertising; today specific figures regarding the distribution of advertising expenditure by different companies to the different types of media—general magazines, newspapers, trade papers, billboards and direct mail—simply are not available for the industry as a whole or for any considerable part of it. Until present practice can be determined accurately and specifically, only a general basis for any elimination-of-waste-in-advertising analysis is possible. Used car stocks—there isn't a factory in business today which is not spending goodly sums of money working on the used car problem with its dealers. Yet until the current data appearing in the new AUTOMOBILE TRADE JOURNAL & MOTOR AGE, no monthly estimate of total used car stocks has been available to the industry. Correlation of figures of stocks of new cars in dealers' hands has been going on for several years so far as a number of important companies are concerned, but even those figures would be more useful than they are to everyone individually and to the industry as a whole if they were complete.

* * *

Start Made by Parts and Accessories Makers

ON a score of other marketing subjects, correlated data from a good proportion of important producers will form the only possible basis for active, practical efforts toward elimination of waste in automotive marketing and distribution. The independent parts and accessory manufacturers in the last year or so have made far more progress toward cooperative effort of this kind than have the car and truck manufacturing groups. Every man who has done any considerable amount of economic research knows that it is impossible to determine just what use can be made of a given set of data until those data have been compiled. In the process of correlation it is to be expected that some of the figures put together will turn out to have no immediate practical significance. But until the necessity for correlated, specific, industry-wide data on marketing matters is generally recognized and urged by vehicle makers, maximum progress toward real merchandising efficiency is not likely to be achieved.

* * *

N.A.C.C. Natural Medium for Such Coordination

THE National Automobile Chamber of Commerce offers a natural medium for the development of coordination of this kind. Business paper units, fully equipped and functioning along statistical and economic research lines as is the Chilton Class Journal Co., offer facilities for performing certain of the actual coordinating operations. Throughout the big development in production economies in the automotive industry, there has been relatively little opposition to exchange of ideas or to inspection of plants by men from other organizations. Similar economies and progress in the more complex marketing problem seem likely to be accelerated only through similar coordination of basic data.—N.G.S.

New Con

By
G. A. Gunther

Fig. 1 — Turntable and sandslinger used for molding drags. Above may be seen the apron conveyor bringing sand from the main scraper conveyor to the sandslinger hopper. The overflow and downrun strand of the main scraper conveyor is shown at the left

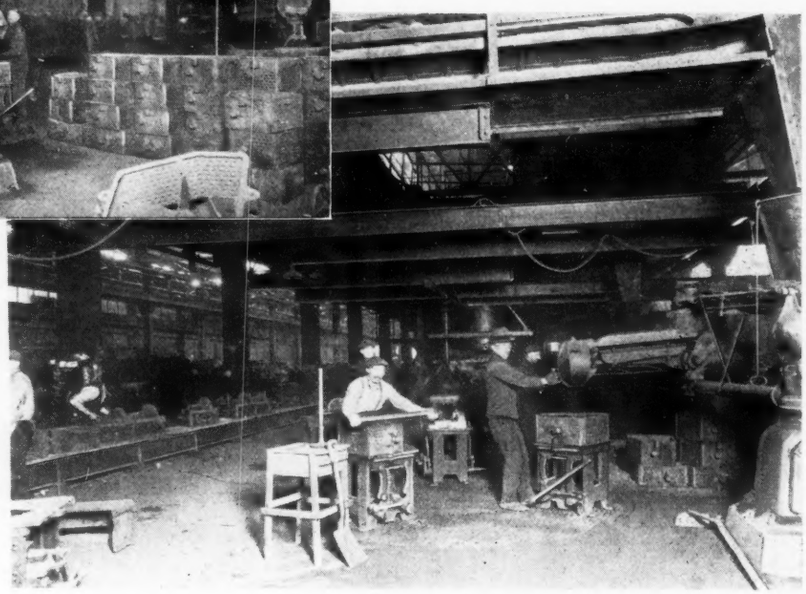


Fig. 2—Turntable and sandslinger for cope molding with the main mold conveyor in the left background, where cores are being placed in molds

A CONTINUOUS molding and sand-conditioning unit was installed recently in the foundry of the South Bend plant of the Studebaker Corp. by the Chain Belt Co., Milwaukee, working in collaboration with Studebaker engineers. The system has produced some remarkable results in lowering costs, speeding up production and permitting much closer control of the operations.

At the present time transmission cases and flywheel housings are the particular pieces being molded on the unit. With the equipment installed about 70 tons of sand are being handled per hour, and 850 transmission cases and nearly 300 flywheel housings are being produced per 9-hour day. The operating force consists of 29 molders, 11 shakeout men, and three for pouring. In addition there are two maintenance men.

Before the installation of this equipment 12 molders and three men pouring and shaking were required to turn out 300 transmission cases per day and 10 molders besides three pourers and shakeout men were needed to produce 300 flywheel housings daily. In both cases the sand used was conditioned by a separate gang of night workmen and the castings were removed by still another gang of men working at night.

Considering all these factors, it is estimated that the installation of the continuous unit produces an approximate saving of $220 per 1000 transmission case castings, and $100 per 1000 flywheel castings. Savings thus estimated do not include the important saving in floor space made possible by mechanical handling equipment, nor the savings made in flask equipment, patterns or other maintenance costs.

Besides these concrete economies there is also, of course, the fact that much better control of output is made possible by the continuous system, so that human effort is conserved and quality of the product assured.

Transmission cases are molded on two revolving turntables on each of which are mounted three stripping machines, equipped with similar patterns, and each served by a sand-slinger.

The turntable shown in Fig. 1 is provided with equipment from which the drag of the mold is made. The speed of the turntable is set to give the operator sufficient time properly to ram each flask without undue exertion. As soon as the turntable brings the molding machine within range of the sandslinger the flask is rammed.

By the time one flask is rammed, the next molding machine is in position for ramming and the operator turns to that. Meanwhile his helper strikes off the surplus sand from the flask already rammed and drops the pattern from the sand. The drag is then ready to be moved to the mold conveyor shown in the background of Fig. 1, by means of the trolley-mounted air hoists stationed at the turntable.

When the drag is placed on the conveyor it starts on its journey toward the pouring floor and before it passes the second turntable (Fig. 2), where the copes are molded, the cores are placed in the drag by workmen who walk along the slowly moving conveyor.

The cope is made in the same manner as the drag and when a finished cope is conveyed to the mold con-

tinuous Molding Unit Reduces *Studebaker* Foundry Costs

Production speeded up and operations brought under closer control by Chain Belt installation.

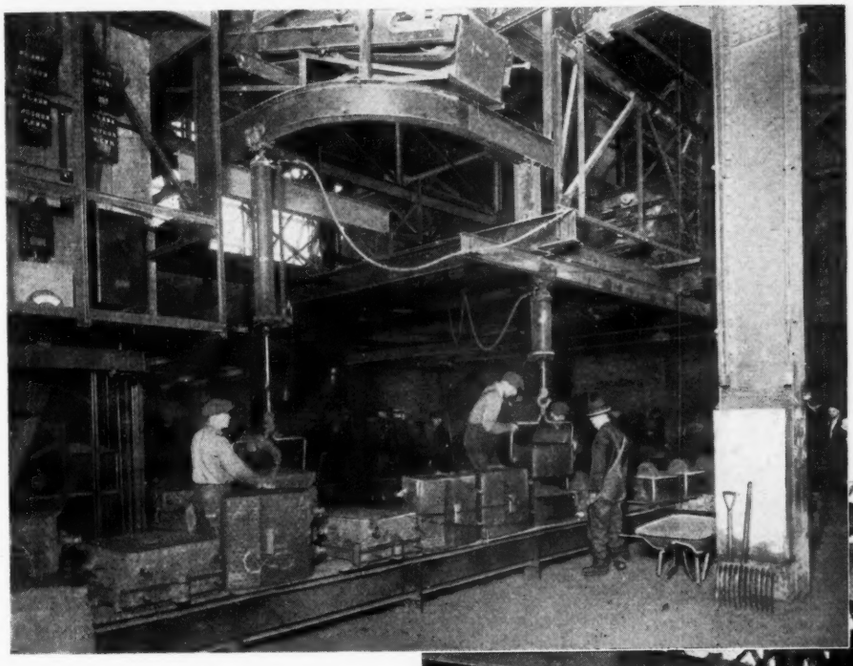
veyor by air hoist it is placed upon a drag, already cored, which awaits it there. With the cope placed in position two men on either side of the conveyor place the clamps and ram up the runner boxes—with the conveyor still in motion. Fig. 3 shows a cope being lowered on its drag, and the cope molding turntable in the background.

The mold conveyor carries the molds onto the pouring floor, shown in Fig. 4, where pouring is continuous and performed with the conveyor still in motion. The metal is brought to the pouring floor by means of an electric monorail crane and, since the monorail system extends to a point close to where molds are closed just after leaving the molding machines, pouring is not confined to a limited length of the conveyor.

After pouring, the clamps and runner boxes are removed from the molds and the latter carried to the knockout floor. They are removed from the conveyor by means of trolley-mounted air hoists as shown in Fig. 5, and are dropped on a knockout grating where the flasks are removed. The flasks are returned to the molding machines by the conveyor shown at the left of Fig. 5 while the sand falls through the knockout floor into a hopper and the castings are taken to the cleaning room.

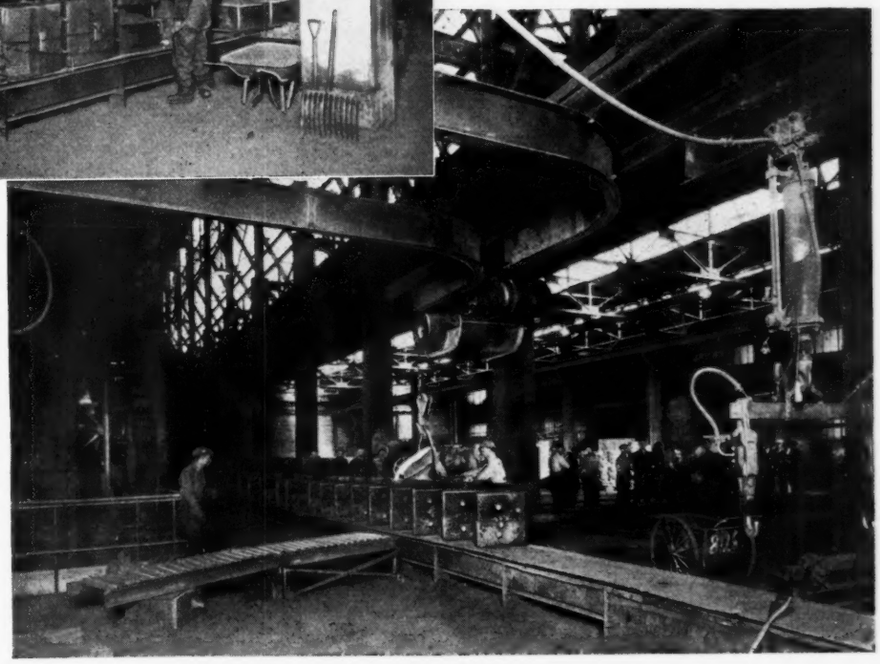
The sand in the knockout hopper is carried by means of a steel-flight knockout conveyor to a magnetic belt conveyor where stray metal, gaggers, etc., are removed from the sand and the latter delivered upon a revolving screen. On the knockout conveyor is an automatic watering device which wets the sand just enough to keep down the dust while the sand is passing through this part of the system.

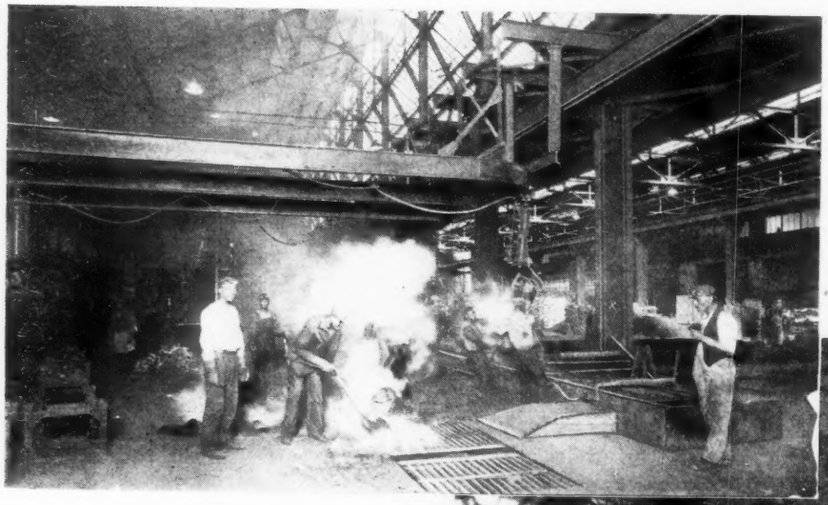
The head end of the knockout conveyor is shown in Fig. 6 with



Left, Fig. 3—Copes are placed on drags by means of trolley-mounted air hoists while the conveyor is in motion

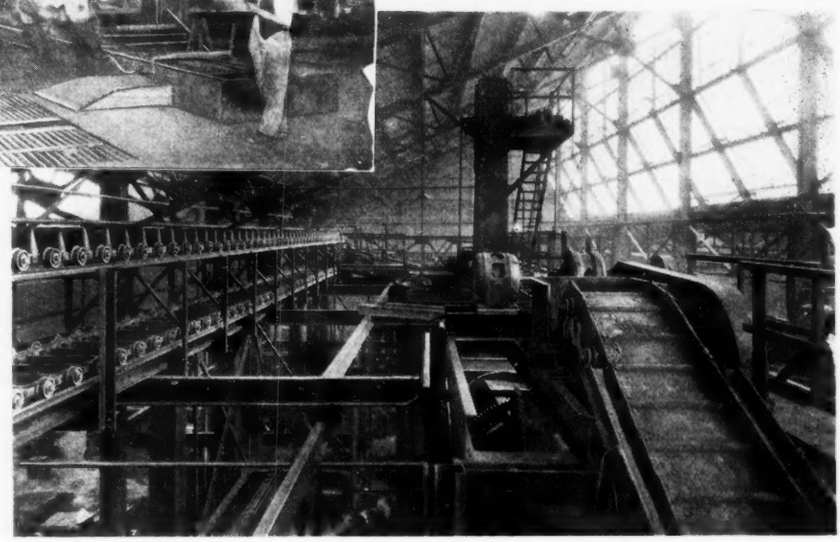
Below, Fig. 4—Pouring molds on the main mold conveyor





Left, Fig. 5—Shakeout floor mold conveyor at right; flask return conveyor at left and shakeout floor in center. Overhead trolley runways are provided for shakeout bails

Below, Fig. 6—Head end of knockout conveyor at right; auxiliary scraper conveyor with molders' hoppers at left and bucket elevators serving storage bins in the background



part of the auxiliary scraper conveyor used in flywheel housing production at the left.

From the revolving screen, where the large cores are removed, the sand feeds into an elevator which discharges onto a belt conveyor running across the top of two 75-ton sand storage bins, as shown in Fig. 7. The belt conveyor is fitted with a plow by means of which sand is fed into either bin as desired.

Throughout these transfers from one conveyor or elevator to another the sand is being cooled and further cooling takes place in the large storage bins. The bins are provided with revolving bottoms and plows can be adjusted to feed the proper amount of sand into the system.

When sand is discharged from a bin, to start upon its journey once more, it is received by a tempering belt conveyor in the basement on which is located another automatic watering device which tempers the sand as required. The tempering conveyor discharges into a revivifier which fluffs the sand and it is then fed into a distributing scraper conveyor for delivery to the molding stations.

The scraper conveyor elevates and conveys the conditioned sand to apron feeders which, in turn, discharge into the sandslinger hoppers directly over the molding machines. There is always a surplus of sand circulating through the scraper conveyor to insure a sufficient amount for all molding purposes.

The strike-off sand from the revolving turntables falls through the floor gratings and is transferred by an ingenious arrangement of sweeps to the belt conveyors under the turntables. These belt conveyors discharge the sand directly into the lower portions of the scraper conveyor which again circulates it through the system. By this means strike-off sand is not reconditioned but is elevated and conveyed again to the apron feeders supplying the sandslingers. A view of the type of scraper conveyor employed in this work is given in Fig. 8.

Flywheel housings are molded on an auxiliary unit which receives its sand from the main scraper conveyor by means of a cross belt conveyor. This unit consists

Fig. 7—Bucket elevator with distributing belt for returning sand to storage bins. The main scraper conveyor may be seen at the left and the auxiliary scraper conveyor at the right

Fig. 8—Scraper conveyor for auxiliary molding units. In the rear center may be seen again the storage bin bucket elevator

of a scraper conveyor very similar in design to the main distributing conveyor and is shown in Fig. 8.

To the bottom of this conveyor is attached a series of hoppers feeding the jolt machines on which flywheel housings are molded. As each flywheel housing is molded it is hoisted by means of an air-lift mounted on trolleys and is transferred to a gravity conveyor which carries the completed molds to the main mold conveyor for pouring. There is always a surplus of sand circulating through this system, also, so that the jolt machines are never held up for lack of sand.

Through this last unit the entire system is cleaned of sand when desired. The revolving bins are stopped, as are the molding operations, and all other units are run. Then the auxiliary unit receives all the sand which is conveyed to the knockout conveyor by means of an overflow cross conveyor. From the knockout conveyor it is carried through the system to the large storage bins where it is stored for use when operations recommence. Fig. 9 shows the surplus sand return belt from the auxiliary scraper conveyor to the knockout conveyor.

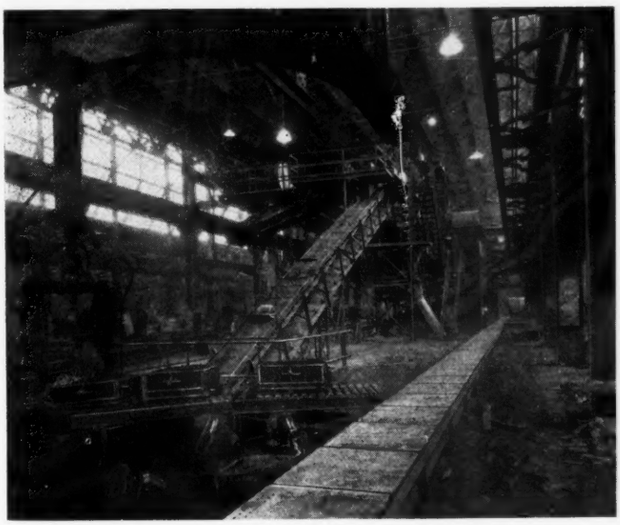


Fig. 9—In the rear center is the surplus sand return belt carrying sand from the auxiliary scraper conveyor to the knockout conveyor. A portion of the mold conveyor is seen in the foreground

Note the magnetic separator head pulley. A portion of the main mold conveyor is shown in the foreground.

Bergius Process in England

IN its recent report the (British) Fuels Research Board mentions that it has been carrying on work with the Bergius process for the liquefaction of coal in an intermediate scale plant since February, 1927. This plant is of the continuously working type and has a capacity of about a ton a day. All of the difficulties which almost invariably accompany the experimental working of a new process have been overcome, and the yield in liquid fuels obtained from the ton of coal is about six times as great as can be obtained by the ordinary coking process. The cost of the process cannot be known until it is tried out on a larger scale, but the view is expressed that its products cannot compete with gasoline at present prices in the British market, although they would be cheaper than imported oils were in 1917-1918. Further economies may be expected chiefly from a reduction in the cost of hydrogen production and from reuse of the hydrogen in the gaseous products of the process.

An option on the rights under the process for the British Empire has been acquired through agreements between the Government, the British Bergius Syndicate and the International Bergin Company, which will continue until a full size plant has been installed and operated for six months, under conditions giving the Government and the British Bergius Syndicate full information as to the working and facilities for inspection. A controlling interest in the British Bergius Syndicate has been acquired by the Imperial Chemical Industries, Ltd., and this firm, which is in an exceptionally favorable position for the further development of the process, is experimenting with it at its own works. It now appears that in order to obtain the necessary hydrogen at the lowest possible cost and utilize the gaseous byproducts of the process to the best advantage, the plant should be combined with coke ovens and with works for the manufacture of synthetic ammonia, and possibly also with a low-temperature carbonization installation.

A ROYAL COMMISSION has been appointed in England to consider problems arising out of the growth of road traffic and to consider and report upon what measures should be taken for the better regulation and control of the means of transport now available in Great Britain, including transport by sea, coastwise, and by ferries, with the object of promoting their coordinated working and development to the greatest public advantage. The commission has invited responsible public bodies and individuals to furnish it information regarding the practicability of increasing the effectiveness of each of the available means of transport, and on the extent to which coordination is practicable.

Characteristics of Oil-Spraying Systems Investigated

Injection lag in crank-degrees decreases with increase of engine speed at constant fuel quantity, but remains constant if fuel quantity is varied at constant engine speed.

FURTHER investigations on oil injection in internal combustion engines have been made at Langley Memorial Aeronautical Laboratory of the National Advisory Committee for Aeronautics, and the tests and results are described by Chester W. Hicks and Charles S. Moore in Technical Note No. 298 of the N.A.C.A.

A cam-operated fuel-injection pump and a centrifugal-type, spring-loaded, automatic injection valve were used to inject fuel into a light-tight compartment, where the spray was observed with the aid of an oscilloscope. The spray image observed could be varied through all phases of the injection cycle by means of an adjustment of the oscilloscope breaker mechanism, and calibration of the oscilloscope made it possible to determine the engine crank angle corresponding to the spray phase under observation.

The effects of variations in engine speed between 400 and 1800 r.p.m. with constant fuel quantity, and of variations in fuel quantity between full load quantity and 50 per cent thereof, on the discharge characteristics of an automatic injection valve and fuel injection system at constant speed, were determined.

The injection lag in crank-degrees was found to decrease with increase of engine speed at constant fuel quantity, but remained constant if the fuel quantity was varied at constant engine speed. The duration of injection in crank degrees increased with both engine speed and fuel quantity. It was found that the oscilloscope could be easily adapted for the investigation of an injection valve and fuel injection system when operating on an engine and injecting into the atmosphere.

In the experi- gine was motored, the fuel in- ments, the en- jected into a light-tight com- partment equipped with an air-scavenging system, and the spray observed under illumination from an oscilloscope. Crank angles were noted for the spray start, for critical points in the injection cycle and for the spray cut-off for a constant engine speed of 1600 r.p.m., with from about one-half to full fuel quantity, and for a constant fuel quantity of 0.00025 lb. per cycle and engine speeds of 400 to 1800 r.p.m.

The engine used was a single-cylinder 5 by 7 in. test engine, and the fuel pump a cam-operated, impact-type plunger pump, which supplied fuel to a centrifugal-type spring-loaded automatic injection valve with a 0.025 in. orifice. A well atomized cone-shaped spray was produced in the atmosphere with a valve opening pressure of 6000 lb. p. sq. in. The fuel quantity was varied by changing the plunger stroke. With this type of pump, change of the plunger stroke also changes the time of injection, and as it was desirable to keep the start of injection constant, the angular setting of the pump had to be changed each time the length of stroke was varied. The time of start of injection was checked by "barring" over the engine.

Design of Oscilloscope

The oscilloscope (see diagram Fig. 1) contained a primary electric circuit with a mechanical circuit breaker, and a secondary circuit with a neon lamp. Current from a 6-volt storage battery was passed through a knife switch and circuit breaker, the latter shunted by a two-micro-farad condenser, and then through the primary of an induction coil. The breaker mechanism was operated by an extension of the engine camshaft, so that the primary circuit was broken once during each cycle. The high voltage induced in the secondary of the induction coil caused a discharge of current through the neon lamp, which produced a flash of light of short duration. The rapid repetition of these flashes illuminated successive fuel sprays at progressive points in the development of the spray and produced an image of a single spray

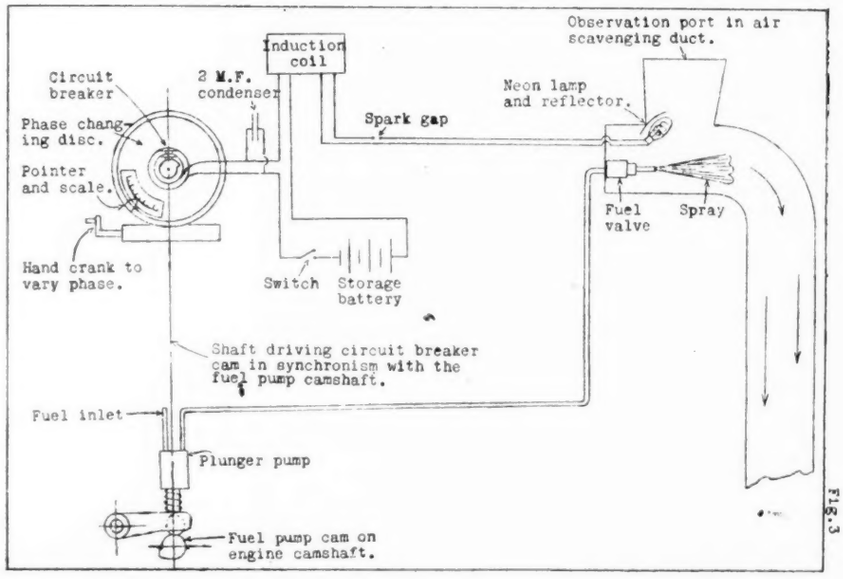


Fig. 1—Diagram of oscilloscope and fuel injection system

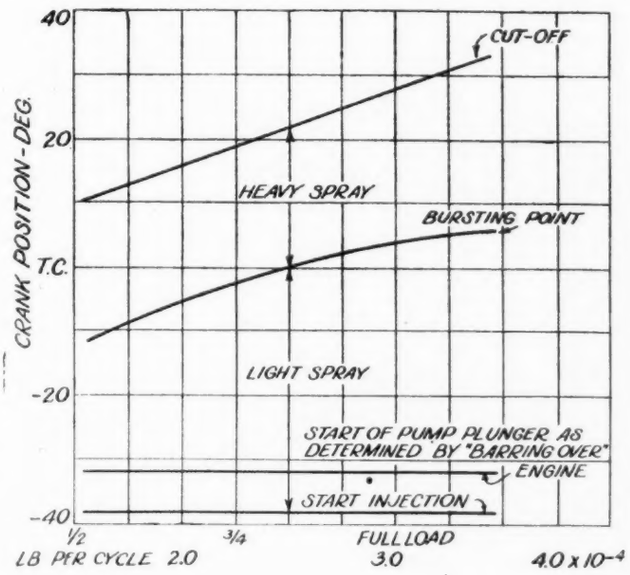


Fig. 2—Effect of fuel quantity on injection lag, duration of injection and spray characteristics of an automatic centrifugal-type injection valve

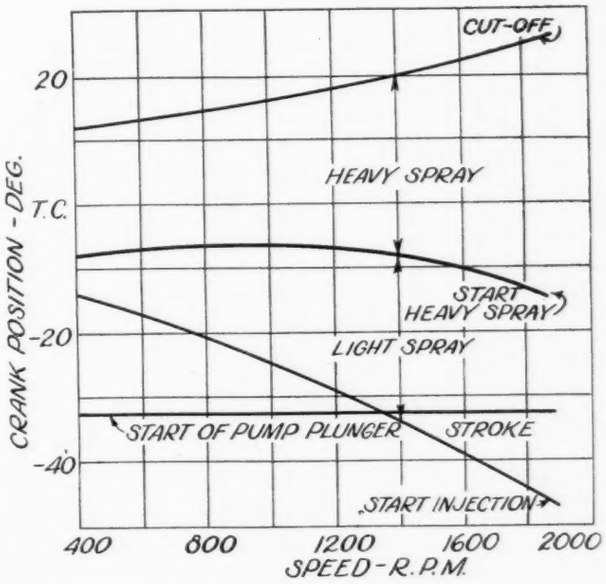


Fig. 3—Effect of engine speed on injection lag, duration of injection and spray characteristics of an automatic centrifugal-type injection valve with a 0.025 in. orifice and a valve-opening pressure of 6000 lb. p. sq. in.

when viewed by an observer. The angular position of the breaker mechanism with relation to the engine crank angle when the primary circuit was broken, was indicated by a pointer and a calibrated sector of the phase-changing disk.

At the start of injection the spray was light, and it required from 2 to 5 crank degrees to develop into a well-defined, cone-shaped spray. The first part of the spray became heavier until a definite condition was observed that indicated the start of heavy spray. A few degrees before the fuel cut-off the spray became less dense, but the cut-off was sharply defined, with a distinct gap separating the apex of the spray cone from the fuel valve nozzle.

The effect of fuel quantity on the time of spray start and cut-off and on the spray bursting point is shown in Fig. 2. As the fuel quantity was increased from about half-load to full-load quantity, at a constant speed of 1600 r.p.m., the injection lag remained constant, while the duration of the light spray and the total duration of injection increased.

Irregularity in Cam

Fig. 2 shows injection to begin 7 deg. before the cam follower should have come in contact with the cam, and oscilloscopic observation showed this to be due to a slight irregularity in the cam outline which ordinary inspection had failed to reveal. Similar observations showed that the cam follower remained in contact with the cam at an engine speed of 800 r.p.m. but left the cam throughout the range of engine speeds between 1200 and 1800 r.p.m.

The effect of engine speed on the spray start and cut-off for a constant fuel quantity of 0.00025 lb. per cycle is shown in Fig. 3. At speeds above 1350 r.p.m. the injection of fuel started before the cam follower should have contacted with the pump plunger.

The events of the fuel injection cycle as determined with the aid of the oscilloscope were definite in most cases. The widest variation in recorded values was noted at the start of the injection for low engine speeds, where the indistinct start of light spray and less frequent flashes of the neon lamp caused variations in readings of plus or minus 2 deg.

French Grand Prix

A TRIANGULAR road circuit at Le Mans, 120 miles from Paris, has been selected for the French Grand Prix limited fuel race on June 30, 1929. This race, the only one directly organized by the French club, is run under the recently adopted international rule providing for a gasoline and oil allowance of 30 lb. of gas and oil per 62 miles. Competitors can select their own proportions of lubricant and fuel out of the total allowance, it being understood that both engine and transmission must be provided for.

Minimum weight of the cars is 1980 lb. empty, this including one spare wheel which must be carried during the race. The gasoline tank must be independent of the body and external, no streamlining being allowed. Distance of the race is 420 miles.

Two other races to be held at Le Mans during the month of June are the Bugatti Grand Prix, for Bugatti cars only, on June 2, and the annual 24-hour race for the Rudge Whitworth Cup on June 15 and 16. It is announced that Chrysler, Auburn and Stutz will run in the 24-hour event.

THE following Simplified Practice Recommendations have been published by the Department of Commerce recently: R35-28, Steel Lockers; R37-28, Commercial Forms; R51-28, Die-Head Chasers; R58-28, Classifications of Iron and Steel Scrap. Copies of these practices can be obtained from the Government Printing Office, those of the three first mentioned being five cents each and those of the last mentioned, ten cents each.

MARC BIRKIGT, designer of the Hispano-Suiza engine, has taken out a patent in England on a composite piston comprising a head section of light alloy and a skirt section of nitrated steel.

What's Wrong With by Penna.

Conclusion reached that no general cooperative effort all along line

THAT there is no general panacea for brake ills but that better directed efforts on the part of all who have to do with brakes would greatly increase their operating adequacy was the consensus of the exceptionally large number of engineers and service men who attended the November meeting of the Pennsylvania Section, Society of Automotive Engineers, at Philadelphia last week.

The discussions covered every part of the braking problem including design, manufacture and maintenance and authoritative speakers representing all these interests took part in the discussions.

It was recognized by most speakers that no one agency was responsible for all the ailments which affect braking systems and that no one remedy was available to cure them. Some braking systems, at least, it was stated, have not been designed properly for the particular service to which they are subjected; other braking systems which may have been designed properly have been manufactured so cheaply that they refuse to render the service to be expected from them, but the best designed and constructed brake will not give adequate service indefinitely without proper maintenance.

Recognizing the fact that all agencies must assume a share of the blame for inadequate brakes, the discussion was devoted largely to practical methods for improving conditions. The first paper of the evening, by P. M. Heldt, engineering editor, *Automotive Industries*, prepared the ground for future discussion by briefly reviewing the problems which were presented—and are still in evidence—by the adoption of four-wheel brakes.

The major problem, of course, was to apply braking effort to the front wheels without interfering with the steering action and Mr. Heldt reviewed the various methods employed to accomplish this successfully.

Small Clearances Cause Trouble

Another problem, and one which still remains a constant source of brake troubles, was that which concerned the pedal pressures required to operate four brakes simultaneously. To do this without increasing pedal pressures beyond what can be obtained easily by the average car driver, smaller clearances between brake drums and shoes have been adopted. This tendency, Mr. Heldt pointed out, has given rise to a great deal of trouble, especially when unmachined, pressed steel drums are used, since they may not be concentric when installed on a car and are also subject to heat warping under severe operating conditions.

Various methods are being used by different manufacturers in an attempt to overcome the difficulties thus presented, including the use of drums of heavier material, machining of brakes after mounting on the hubs, the use of molded or metal brake shoes to eliminate undue expansion by water absorption, and other ways. The problem still remains unsolved, however, and a method of obtaining and maintaining cheaply and surely the very small clearances required to permit easy operation of four-wheel brakes is still being sought.

According to tests made by the Bureau of Standards and reported by H. H. Allen of the Bureau, most four-wheel brakes are adequate if properly adjusted and regulated. A large number of cars and trucks were tested and while the average results were rather surprisingly poor, it was discovered that in most instances the care of the brakes and not their design or construction was at fault. In a test of some 400 passenger cars, in which two-wheel brake cars were more numerous than they are, probably, in the cars on the highways today, only 11.2 per cent of them were able to stop in less than 30 ft. from a speed of 20 m.p.h.

Theoretical calculations, Mr. Allen said, would indicate that from this speed a car equipped with four-wheel brakes should stop in about 15 ft., and a two-wheel brake car in 20 ft. Nearly 30 per cent of these 400 cars required over 50 ft. to stop and the average stopping distance of the lot was 47 ft.

The record for trucks was even worse. Using the foot brake alone, only 11 per cent of 350 trucks tested could be stopped in less than 40 ft. from 20 m.p.h., while the average stopping distance for all was 85 ft. This test indicated that hand brakes on trucks are mostly ornamental, 37 per cent of the trucks tested having required over 100 ft. to stop under the application of hand brakes alone with an average stopping distance for the lot of 120 ft.

For trucks, at least, Mr. Allen stated that improper care of the brakes was the principal cause for the poor showing since groupings by makes of trucks tested showed, in general, as wide a range of performance between trucks of the same make as between trucks of different makes.

In starting the discussion dealing with actual brake troubles, E. B. Neil, manager Research Department. *Automotive Industries*, listed a number of items which he believes are largely responsible for brake failures.

Brakes Discussed S. A. E.

panacea for present ills exists, but that would increase operating efficiency.

The first item mentioned was sticking brake linkages and Mr. Neil commented favorably on the recent adoption by some manufacturers of ball bearing linkages to assure prompt and free action at all times.

Too light rods which spring when brakes are applied is another source of weakness which might be remedied easily by the designer. Brake drums are usually too light, Mr. Neil believes, making them very susceptible to warpage when heated and rendering the maintenance of close clearances between drum and brakes exceedingly difficult, if not impossible, without causing dragging.

He also launched a shaft at brake linings which do not retain their original shape under all service conditions and pointed out that with the close clearances made necessary by four-wheel brake operating requirements any change in the shape of the lining is almost sure to result in dragging brakes which lead to scored drums, squealing brakes and general inefficiency.

Says Factory is at Fault

From the experience of the Philadelphia Rapid Transit Co. in maintaining a large number of buses and taxicabs, H. B. Hewitt has arrived at the conclusion that a major portion of brake troubles are due to design and manufacture. His company has brake maintenance organized as well as it knows how but it still encounters a great deal of trouble and has been unable to obtain brakes which give the same service that other units of a bus or taxicab give.

He recommended the use of better materials in brake mechanisms, not only for the brake drums but for the rods and other operating parts as well. Closer limits should be adhered to in manufacture and he stated that his company has, with no great success, held out for 0.005 in. clearance between drums and liners. He suggested Steelited drums or some similar method which would increase brake life with the ultimate idea that adjustment of brakes could be made as infrequently as other overhauls of various engine and chassis parts. Under present conditions, Mr. Hewitt said, buses have to be called in for brake adjustment much more often than for any other reason but since all buses are placed on brake testing machines to assure proper adjustment before they are released he believes that the fault lies at the manufacturer's door and not, in P. R. T.'s case, at least, with the methods of the maintenance department.

F. A. Whitten, chief engineer, American Car & Foundry Co., presented, by letter, a very interesting development which has been made by his company. Formerly ACF buses were equipped with metal-to-metal brakes operated by air but now there has been developed a brake drum of special alloy cast iron, produced in the ACF foundries, which, in connection with any standard highly compressed lining, gives remarkable service.

Stands Up Under Severe Test

To make a test in this new material to compare with bus service in mountainous country where brakes must be applied continuously for long periods a vehicle was taken to the top of a 10 per cent grade, started down and the brakes applied by a turnbuckle to keep the speed at 25 m.p.h. At the bottom of the hill the car would be driven, with the clutch engaged, by means of the hand throttle at 25 m.p.h. with the brake dragging as it had been set on the hill.

With the brake drum material finally developed it has been possible to drive a vehicle continuously for 200 miles with the brake dragging in this manner without scoring the drum. As a matter of fact, Mr. Whitten wrote, the drums are polished off to a beautiful finish somewhat resembling plate glass. So much heat is developed in a run of this kind that the drums are turned blue, the wheel, drum and neighboring parts are so hot a match can be lighted on any of them and the tires are absolutely ruined but the surface of the brake drum remains smooth and the brake continues to operate.

A. K. Brumbaugh, White Motor Co., Cleveland, made the point that the best of design and maintenance cannot compensate for poor manufacture and emphasized the need for more care in all the detail processes of production of brake parts.

Some discussion arose as to the relative merits of molded and woven lining with no particular decision being made. It was suggested by representatives of various lining manufacturers that molded lining as well as woven lining each have particular characteristics making them more suitable for certain conditions.

The entire discussion during the meeting was under the direction of John A. C. Warner, Studebaker Corp., South Bend, who contributed a full share to the technical discussions.

Other experts on various brake subjects who took an active part in the meeting included George W. Blackinton, factory manager, Continental Motors Corp.; and Messrs. Rohrer, U. S. Asbestos Co.; Leeds, Raybestos Co.; Casler, Westinghouse Air Brake Co., and Williams, American Air Brake Co.

NEW DEVELOPMENTS—Automotive

Putnam Production Machines

TWO new automotive production machines have been developed by Shaw Crane-Putnam Machine Co., a subsidiary of Manning, Maxwell & Moore, Inc., Fitchburg, Mass. Fig. 1 shows a vertical cylinder boring machine while Fig. 2 shows a vertical valve hole drilling and reaming machine. The two units are alike in construction principles but differ, of course, in the head design.

The spindles are direct motor driven. The motor is mounted on the head close to the tools and the drive is made through chrome vanadium steel helical gears whose shafts run on Timken roller bearings. Pick-off gears may be applied to give 25 per cent variation in spindle speed either up or down.

The Timken bearings are mounted on a separate plate which makes it possible to change the center-to-center distance of the spindles by installing new plates and spindle gears in the head. This construction is shown in Fig. 3. The outer bearing cups are pressed into the steel plate and the inner cones of the Timken bearings are machined directly on the shafts. This use of steel plates and Timken bearings permits the use of large spindles and high operating speeds.

The saddle has a narrow guide and is over-counterbalanced to assure a thrust load against the Oilgear hydraulic feeding mechanism which can be controlled manually or automatically. Under automatic operation the machine goes through an entire cycle, stopping only for work to be changed.

The cylinder boring machine can be furnished with four, six or eight spindles and the vertical capacity can be altered to suit any requirements. In the machine shown in Fig. 1, the spindle is 14½ in. from the column face and the distance from the spindle ends to the work table can be varied between 31 and 79 in. A 48 by 25 in. work table is provided and is 12½ in. above the floor. A 20 hp. constant speed motor with push button control is recommended for the drive.

The valve hole drilling and reaming machine shown in Fig. 2 can be furnished with six, eight, 12 or 16 spindles and like the other machine the vertical capacity can be altered to suit requirements. In the particular machine shown the spindles are 13 in. from the column; the spindle ends can work from 32 to 58 in. above the work table, which is 56 by 27 in. and is located 10½ in. above the floor. A 5 hp. motor is recommended for this machine.

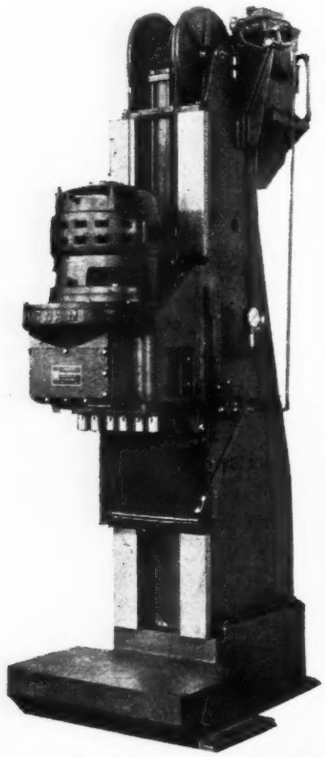


Fig. 1. Putnam vertical cylinder boring machine

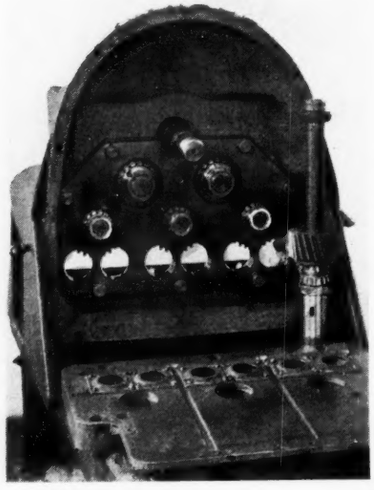


Fig. 3. Separate plate mounting for Timken bearings which make possible changes in center-to-center spindle distances simply by replacing plates

Sinuous Air Filter

A NEW type of air filter, designated as the Sinuous Horizontal Air Filter, has been developed by Midwest Air Filters, Inc., Bradford, Pa., in various capacities to meet practically any filtering requirements.

The principle of the new filter is to provide an air flow so shaped that eddy currents, turbulence and uncontrolled air will be eliminated. To do this, the filter has but one sinuous bend, so designed that the energy used up in accelerating the air flow when the air stream is bent and its dust particles deposited on the filter surface is not dissipated but is regained by application of venturi principles and transmitted practically unimpaired to the outflowing air stream.

This arrangement permits a small filter to handle air at high velocity without increased or decreased efficiency.

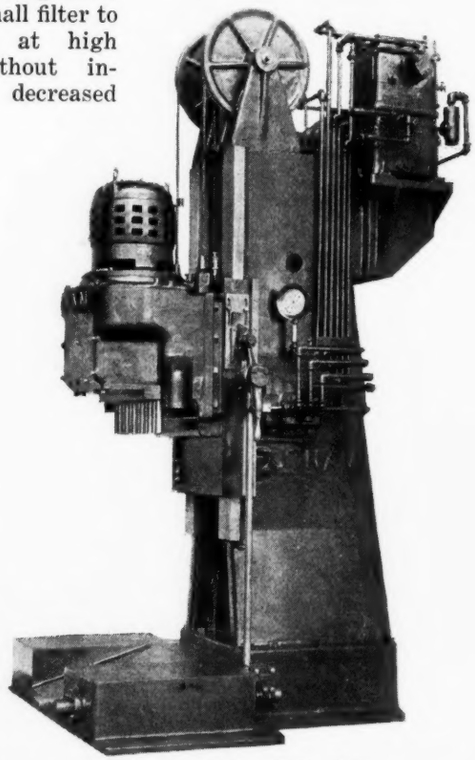


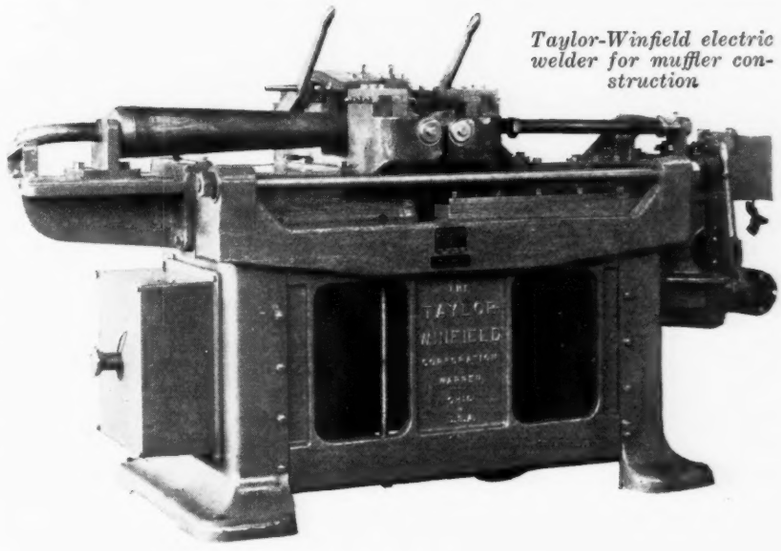
Fig. 2. Valve hole drilling and reaming machine

Parts, Accessories and Production Tools

Automatic Welder

AN automatic welding machine for use on stock from which mufflers are made has been placed on the market by The Taylor-Winfield Corp., Warren, Ohio. It is known as the Type B-11 Special, is motor driven and provides uniform and accurate welding.

Timing of the current and upsetting the weld are both accomplished by means of adjustable cams which eliminate manual operation and permit the use of unskilled labor for operating the machine. In the particular machine shown in the illustration the head of the muffler is welded to the body and the intake and outlet tubes are welded to the head, thus making an entirely welded muffler.



Taylor-Winfield electric welder for muffler construction

Palmer-Bee herringbone speed reducer

Herringbone Speed Reducers

PALMER-BEE CO., Detroit, has just placed on the market an entirely new line of herringbone speed reducers. This series has been added in order to meet the demand for stronger, more modern and efficient inclosed gear reduction units.

Anti-friction bearings are used throughout; ball bearings on the high-speed, Hyatts on the intermediate and Timkens on the slow-speed shaft. Gears are continuous-tooth herringbone, with silent Kysor tooth form, producing more rolling and less sliding action than heretofore has been obtainable. The slow-speed gears in the double and triple series are divided in the center, permitting a more symmetrical arrangement of the gearing and a uniform load on each bearing.

Three-point method of mounting has been adopted in bolting the reducer to the sub-base. Alignment of the various elements of the drive are thus facilitated. No outboard bearings are required for overhung loads up to the maximum rated capacity of the reducer. This feature is one of no little importance when the additional expense and inconvenience of including them in certain drive layouts is considered. The efficiency of the single series reducers is approximately 99 per cent, and of the double series about 97 per cent.

Biflex Fuel Pump

BIFLEX PRODUCTS CO., Waukegan, Ill., has placed on the market a new type of fuel pump built around a Sylphon metal bellows, made by Fulton Sylphon Co., and which has been used for many years in various thermostatic and mechanical devices.

In this pump fuel is received inside the bellows on the intake stroke or when the bellows are expanded, and is forced to the carburetor on the exhaust stroke or when the bellows are contracted. Two models of pump are offered differing only in the means used to operate the bellows. In one, shown in the accompanying illustration, a rocker arm operated by an eccentric is employed to expand and contract the bellows while the other model employs a push rod instead of a rocker arm.

When the movement of the rocker arm reciprocates the plunger *EE* in Fig. 1, the bellows is expanded, causing a vacuum in the intake passage *D* and causing fuel to flow from the main tank through the filter *J* and into the bellows. Further operation of the eccentric compresses the bellows, forcing the fuel therein through the outlet valve to the carburetor.

After a few repetitions of this movement, when starting an engine, the pumping chamber and carburetor bowl are filled with fuel and the pressure spring *C* and the resilient action of the Sylphon bellows produce a predetermined pressure upon the fuel supplied to the carburetor. As the pressure increases the movement imparted to the bellows head decreases under the action of the cushion spring *L* and the movement will finally be adjusted to the proper operating conditions for which the device was designed.

The spring *C* and the resilience of the bellows determine the pressure under which fuel is delivered, and these are usually selected so that cut-off or dead-end

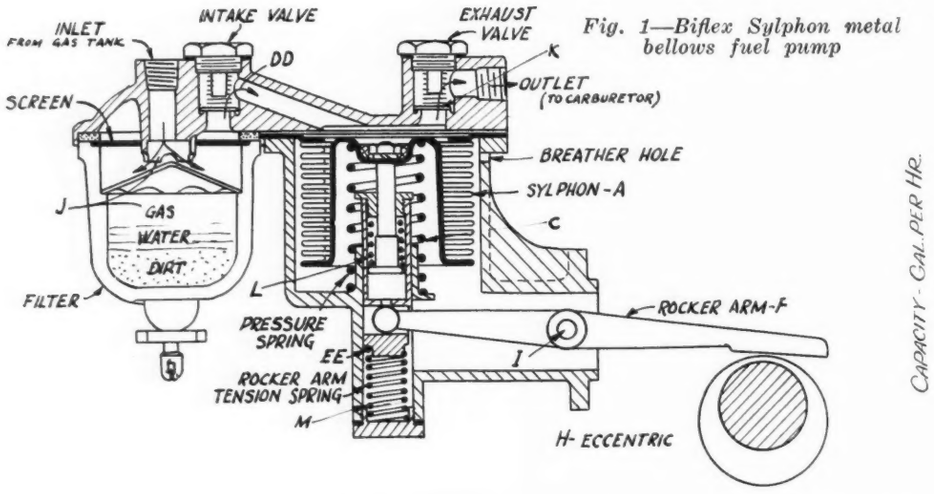
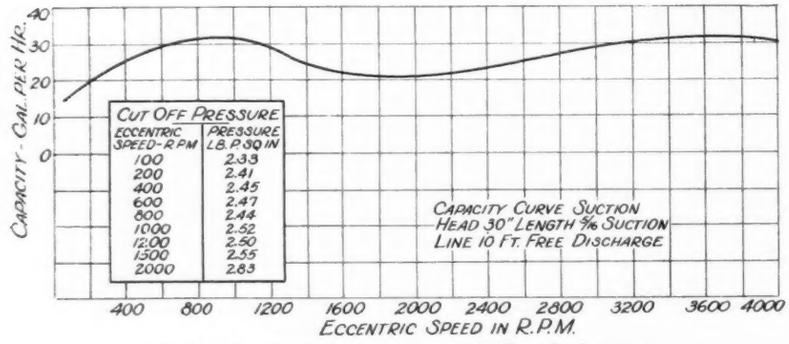


Fig. 1—Biflex Sylphon metal bellows fuel pump

pressures are not more than about 2½ lb. per sq. in.

The bellows is made of metal, is unaffected by atmospheric conditions and operates satisfactorily in warm, cold, dry or wet weather. It resists ordinary corrosion and is unaffected by gasoline.

The pump is self-priming under engine starter speeds



Operating test data curve of Biflex fuel pump

and tests show priming time of 25 sec. at 50 r.p.m. Through 175 in. of 5/16 in. tubing, having a 42-in. lift and at self-starter speed, gasoline reached the strainer bowl in 15 sec. and reached the carburetor through 24 in. of ⅜ in. tubing in 20 to 35 sec.

Future of British Show

(Continued from page 746)

along these lines will be watched with interest for their effect on buying.

Along with this study there is in evidence a disposition to look into the new model question from a broader aspect—to raise the question, specifically, whether models are not being changed too often, and whether the changes are not exercising an undue influence on the mounting costs of distribution. It is held that not only the production costs, but also the sales department costs involved in model changes are greatly out of proportion to their merchandising value, not to mention their disturbing effect on the sales curve.

Particularly is this true, say the proponents of the position, since changes nowadays are more in the matter of form and detail than in substance. As against the sales stimulus afforded by new models there is a vast amount of detailed work in the sales department, including the preparation of new sales "literature" and service manuals, the rebates to dealers on stocks of old models, and a host of other costly tasks.

The desirability of frequent changes is, however, firmly held by a majority of the executives of the factories, and under present competitive conditions, both within and without the industry, there is little likelihood that the position taken by those opposed to yearly innovations will make much headway. The public has become used to style changes and probably would react unfavorably, at least at the beginning, to a different sort of policy, although the public in the end would benefit by slower depreciation of new cars, as would the dealers so far as used cars are concerned.

The whole subject of model changes is, nevertheless, very much in the foreground, and the results of the British inquiry into the situation will therefore be watched with keen interest in this country.

TESTS made in the laboratory of the Bell Telephone Co. in New York on the new alloy Permivar, which consists of 45 per cent nickel, 25 per cent cobalt and 30 per cent iron, are described by G. W. Elmen in the September issue of the Journal of the Franklin Institute. This is a high magnetic permeability alloy, and when properly heat-treated its magnetic permeability for moderate field strengths is approximately twice as great as that of iron. It is constant for fields not exceeding 2 gauss. For a magnetic induction of 100 gauss the hysterisis loss is only 2.4×10^5 ergs per cu. cm. per cycle, while that of permalloy (78 per cent nickel) is 3.3×10^2 ergs and that of iron of the order of 1 erg. Slow cooling through the range of temperature 500-400 deg. C. and baking for a considerable time at 425 deg. C. appears to be necessary to bring out the characteristics of the alloy. This new magnetic alloy was developed particularly for the cores of telephone loading coils but may prove of advantage also for the cores of ignition coils.

IT has been decided to create in Italy a special automobile standardization office, similar to that in Paris, which was established in 1926 by the Automobile Accessories Manufacturers Association. There is said to be a close understanding between the French standardization bureau and the Italian industry and it is expected that the greatest possible number of standards will be made the same for the two countries.

In view of the fact that the French bureau already works together with all of the Belgian manufacturers, it will be seen that this Franco-Belgo-Italian group will have standards which may be considered as "European." In countries using the metric system of measures it is somewhat inconvenient to use the Anglo-Saxon standards, which are generally expressed in inches and which, when converted into millimeters, do not give "round numbers."

Swashplate Replaces Crankshaft in Michell Five-Cylinder Automobile Engine

Crankless powerplant said to have absolute running balance and to be simpler, lighter and more compact than other types. Can be built in single or double-ended form.

By P. M. Heldt

A CRANKLESS engine for which it is claimed that it has absolute running balance and that it is simpler, lighter and much more compact than engines of other types of the same horsepower capacity, has been invented by A. G. M. Michell, well known as the inventor of the Michell pivoted thrust bearing, which is widely used in marine practice.

The engine is of the swashplate type, and the bearings between the swashplate and the slippers which communicate the piston motion to it, embody the same principle of the oil wedge as does the Michell thrust bearing. The swashplate and its related parts form a substitute for the crank train. This mechanism is applicable also to other types of machinery, such as pumps and compressors. Readers of *Automotive Industries*, however, will be interested most in its application to internal combustion engines, and the description given farther along in this article applies to a five-cylinder engine specially designed for automobile use.

The Michell crankless engine was first built in Melbourne, Australia, in 1922, where the Crankless Engines Co. manufactured to the order of the Australian Gas Light Co. of Sydney, both an internal combustion engine and a gas compressor embodying the swashplate mechanism, the two units being mounted on the same base and direct-connected. The American rights under the patents on the engine are controlled by the Michell Crankless Engines Corp., 19 West Forty-fourth St., New York City, which plans to issue licenses for its manufacture. Licenses covering applications in certain lines outside the automotive field have been issued already.

Engines for automobile use can be built either in single-ended or double-ended form. In both cases the cylinders are arranged parallel to and at equal distances from the main-shaft axis, and the cylinder axes also have equal angular spacings. In the single-ended engine all of the cylinders are arranged on one side of the swashplate, while in the double-ended one they are arranged in two groups, on opposite sides of the swashplate. The swashplate makes an angle of 22½ deg., with a plane perpendicular to its axis of rotation, and the piston stroke is equal to the diameter of the circle containing the cylinder axes times the tangent of 22½ deg. (0.414). Angles greater or less than 22½ deg. can be employed, but an angle of approximately that magnitude prevents the greatest advantages.

Complete dynamic balance can be obtained with as small a number of cylinders as three. The mechanical balance being complete, any number of cylinders from three up can be used for a single-ended engine, and from six up for a double-ended one.

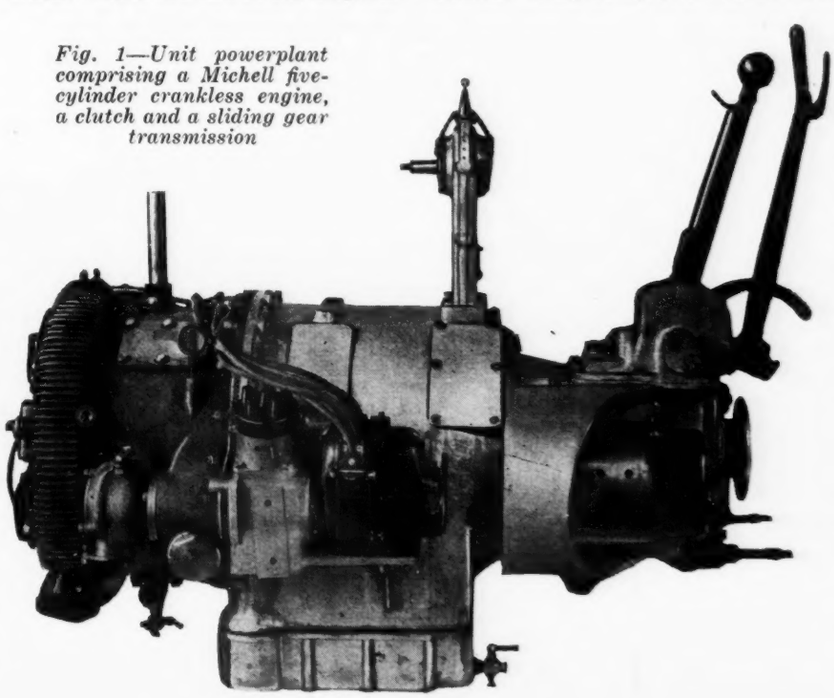


Fig. 1—Unit powerplant comprising a Michell five-cylinder crankless engine, a clutch and a sliding gear transmission

Fig. 1 herewith shows a five-cylinder single-ended motor car engine combined with clutch and transmission. This particular engine, which has a bore of 2.82 in. and a stroke of 3.90 in., was installed in an Oldsmobile Series E chassis. The transmission is the same as that originally used in the Oldsmobile.

Longitudinal and transverse

sections of the engine are shown in Figs. 3 and 4. It will be seen that the main shaft, which is quite short, is carried in two SKF self-aligning ball bearings, and is forged with an integral flange to which both the swashplate and the flywheel are bolted. At the front there is an extension to the main shaft which carries the pinion for the timing gear and the clutch for the hand starting crank. The timing gears are of the planetary type and are so proportioned that the internal toothed crown gear makes one revolution to four of the main shaft. Since each piston makes one reciprocation during one revolution of the main shaft, and each valve therefore must open once for every two shaft revolutions, the cam-plate secured to the crown gear is provided with double cams, each valve being opened by the same cam during alternate cycles. There are separate cams for the inlet and exhaust valves, at different distances from the shaft axis.

Cylinders in Single Casting

All of the five cylinders and the engine housing are formed in a single casting. The valves are arranged in the cylinder head and are actuated through rocker levers and pushrods in much the same way as in a conventional valve-in-head engine. The pistons are of light alloy and of trunk form, and each piston is bolted to a yoke which spans the rim of the swashplate and has a bearing in an enlarged bore of the cylinder extension.

Piloted in the rear end of the main shaft is the clutch shaft which carries the driven member of the single plate clutch inclosed in the flywheel. A drive for the accessories is taken off the main shaft through a pair of spiral bevel gears.

The question now arises as to how the moving parts are balanced. It is obvious that the swashplate by itself produces a rotating couple and therefore tends to cause the engine to vibrate, but the pistons also create a rotating couple, and the two couples can be made to neutralize each other. The effect of centrifugal force

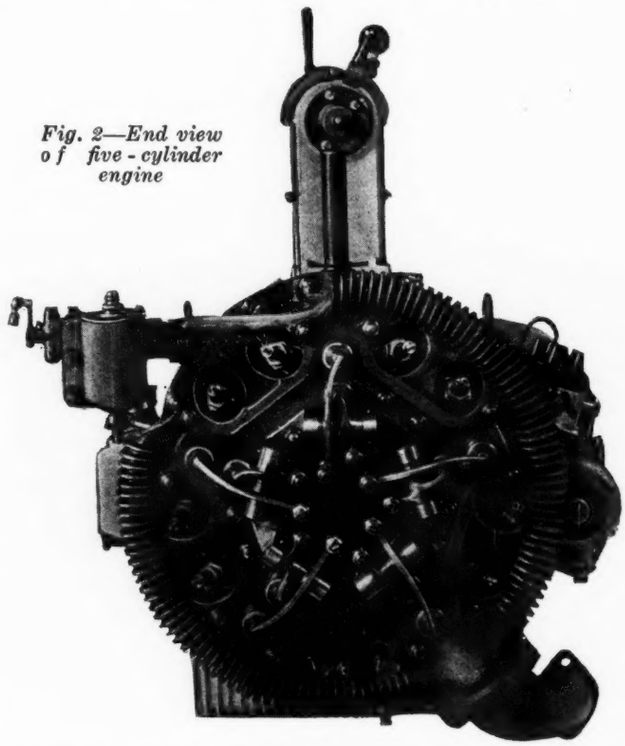


Fig. 2—End view of five-cylinder engine

—which is the basis of the rotating couple on the swashplate—tends to cause that member to assume a position at right angles to the axis of rotation. That portion of the swashplate which is at the top of the longitudinal section, therefore, tends to move toward the right under the influence of this force. The piston acting directly on this portion of the swashplate, owing to the inertia force on it, tends to move toward the left and to carry the swashplate along with it toward the left, and to effect complete balance it is only necessary to have a certain relation between the masses of the piston and the swashplate. The motion of the piston in this case is a simple harmonic one, and there are no secondary, tertiary, etc., unbalanced forces.

With a single-ended engine as shown in the drawings, the side thrust is taken on the yoke, and there is no side thrust of the pistons on the cylinder walls. In double-ended engines the yoke does not form a cross head and the side thrust due to the angularity of the swashplate is then taken on the two cylinders whose

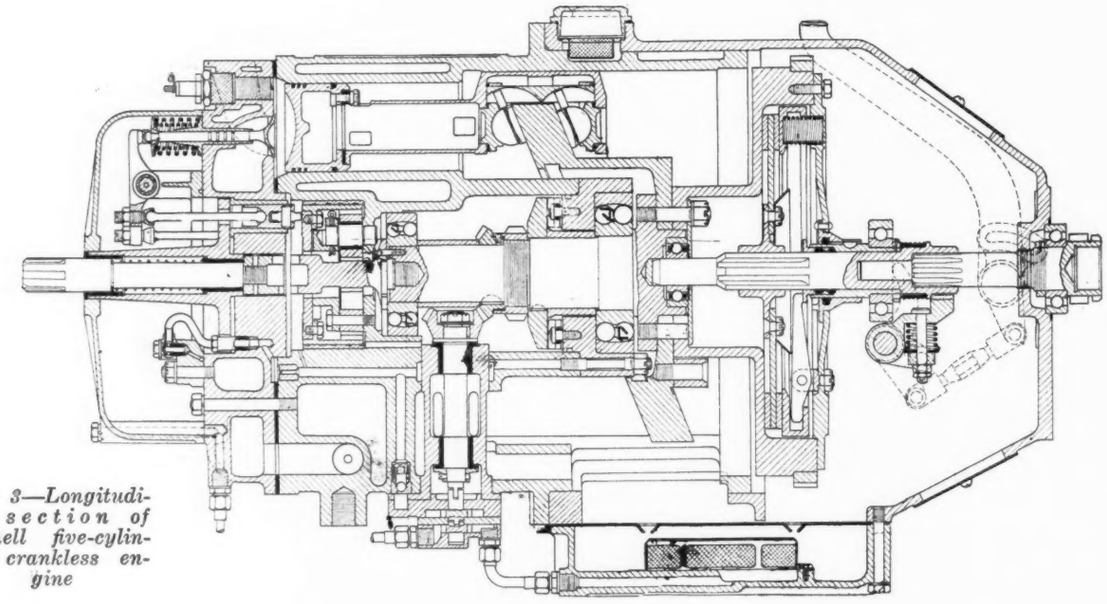


Fig. 3—Longitudinal section of Michell five-cylinder crankless engine

pistons are connected by the yoke. In connection with the side thrust it is of interest to point out that this is not always in one plane, as in an engine with a crank train, where the change in direction of the thrust is the cause of piston slap, but varies in direction continually. This is claimed to eliminate piston slap.

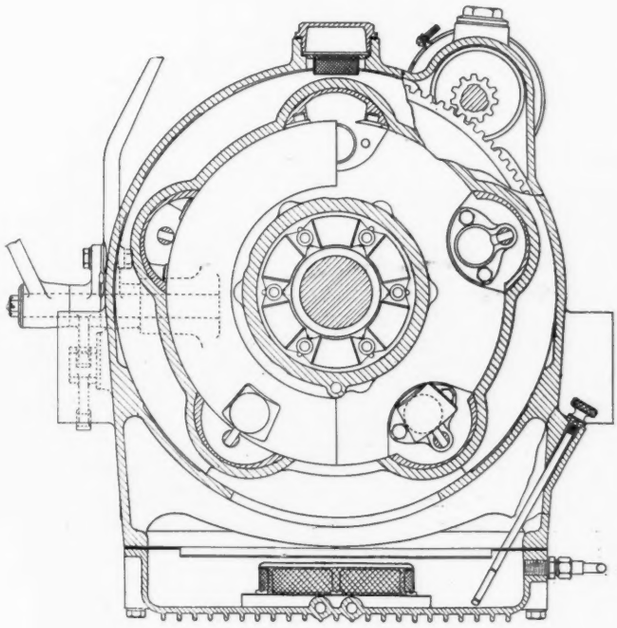


Fig. 4—Cross-section of Michell engine

The essential feature of the Michell engine, as already pointed out, is the substitution of a swashplate and yokes for the crank and connecting rods, and it has been shown that one of the results of this substitution is the elimination of harmonic forces due to piston inertia of a higher than the first order, and the complete balancing of these harmonic forces by the centrifugal forces on the swashplate. It is apparent, however, that the bearing conditions also are materially changed, as compared with the conventional engine. There are no piston pin bearings and no crankpin bearings, while the main shaft bearings are of the self-aligning ball type and the losses at these bearings must be practically negligible. However, there are the slipper bearings on the swashplate and the thrust bearing on the main shaft. From the fact that the speed of the sliding motion between the slippers and the swashplate is quite high, it might be inferred that there would be considerable frictional losses at these bearings. The bearings, however, are of the Michell oil-wedge type, as illustrated diagrammatically in Fig. 5. The principle of the Michell bearing is that a bearing plate is supported off center, the line of support being farther from the leading edge, where the oil film enters between the bearing surfaces, than from the trailing edge. The result is that the unit pressure on the bearing surface is less near the leading than near the trailing edge, and the oil film will be thicker at the leading edge, forming an oil wedge. With such a bearing the friction is said to be exceedingly small.

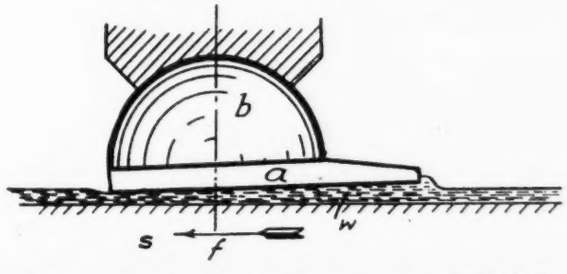


Fig. 5—Sketch illustrating principle of Michell offset thrust bearing

In the Michell engine as illustrated by the drawings, slipper cups machined from aluminum alloy castings are piloted in the yoke. Clearance is adjusted by inserting steel shims under the flange of the rear slipper cup. The slippers themselves are formed integral with a hardened and ground ball and are provided with a babbitted bearing surface. Each slipper is provided with a slipper tail or guide pin which moves in a self-aligning guide working in extensions machined on the slipper cups. Each guide has two milled slots to receive the tails of a pair of slippers, and is an easy working fit in the slipper cup extensions.

Chattering is Prevented

In order to prevent the edges of the yoke from chattering due to contact with the swashplate, each yoke is fitted with a pair of small phosphor bronze slippers pivoted off center, which bear on the outer cylindrical surface of the swashplate.

Oil is constantly delivered to the swashplate near its inner edge. Under the action of centrifugal force it flows outward over the surface of the plate, thus insuring constant lubrication of the slipper bearings.

The thrust bearing on the main shaft takes thrust due to fluid pressures only, as the inertia forces have no unbalanced component in the direction of the main shaft axis. This bearing consists of six babbitted phosphor bronze pads which are arranged in a ring and located in position on the fixed rear main bearings housing by means of set screws between them.

The engine to which the above description applies develops 23 hp. at 1600 r.p.m., which corresponds to a brake m.e.p. of 93.8 lb. p. sq. in. It has a compression ratio of 5½ to 1. Taking account of the fact that it is of quite small size, with only a 121.7 cu. in. piston displacement, these figure indicate that the mechanical efficiency is not at all bad.

SWEDEN has a large wood pulp industry, and one of the by-products of this industry is so-called sulphite alcohol, which is adapted for use in automobile engines, particularly when admixed with gasoline in suitable proportions. The properties of this liquid as an automobile fuel were discussed by Prof. E. Hubendick at the World Power Congress in London. By distilling over quicklime (which has great affinity for water) an alcohol almost free from water can be obtained, which will mix and remain in homogeneous mixture with gasoline in all proportions. To prevent this alcohol from being used as a beverage it is denatured with 0.19 per cent of croton aldehyde. Mixtures containing up to 23 per cent of alcohol call for no alterations in the carburetor and give excellent results. Mixtures with a higher alcohol content can be used, but in that case the carburetor air must be preheated, the float valve adjusted owing to the higher specific gravity of alcohol as compared with gasoline, and the ignition changed. The amount of preheating depends to a certain extent upon the humidity of the atmosphere, but for best results it must be sufficient to insure complete vaporization of the fuel and prevent the condensation of atmospheric moisture.

Beauty Rather Than *Style* is Aim in Modern *Body* Design

Metropolitan S. A. E. told that car should be treated as whole in order to get pleasing ensemble effect. Psychology of color is important.

TREATMENT of the car as a whole by body designers and as something to be made beautiful rather than simply stylish was the definite line of attack outlined for future progress in body design at the meeting last week of the Metropolitan Section, Society of Automotive Engineers, held in New York.

Amos E. Northrup, designer of the present highly successful Hupmobile bodies, and now connected with the Willys-Overland organization, in the first talk of the evening, emphasized the point that many designers are striving too hard for effect and obtain that object by methods which too frequently detract from the beauty of the ensemble. Too many gadgets are being placed in cars, he maintained, and while most of them may be necessary to carry out the idea of comfort and convenience so uppermost in the minds of car buyers, Mr. Northrup believes that a great deal could be accomplished in the way of making these gadgets less conspicuous.

He welcomes the approach of the time when body designers will have a much greater influence on the design of the entire car. In the early days the hood, cowl, running boards, aprons, radiator and various other parts were selected by the chassis and engine designers and when the job was turned over to the body designer the latter's choice of design was very much restricted.

Fortunately, according to Mr. Northrup, this condition is slowly giving way and body designers are being called in much earlier in the design process so that many modern cars are being designed from the radiator to the rear bumpers with the idea of making a good-looking ensemble.

Much is still to be done in this respect, however, and Mr. Northrup believes that a great deal more thought must be given to the idea of ensemble designing in order to produce cars which, from stem to stern, accurately present the picture which has been sought for in the design.

Amos E. Northrup

Among detailed developments impending, Mr. Northrup suggested the front-wheel drive as being of major importance to body designers, giving them, as it does, much greater latitude in the design of the entire body. Floors can be made much lower and there will be practically no restrictions on the carrying out of the designer's ideas in producing a comfortable and beautiful car.

Mr. Northrup does not like present-day radiator design. The abrupt ending of all horizontal lines at the edge of a flat radiator is not conducive to the best treatment, he believes. Without specifying exactly what design he favors, he intimated that some method by which horizontal lines of the car might be swept to a point in front would not only improve the general appearance but would more fully carry out the idea of motion so essential in modern design.

In fact, the entire front end of modern cars needs considerable improvement, according to Mr. Northrup. They are too mechanical, he believes; and with so many projecting elements as to destroy any semblance of beauty.

Safety is as much a part of good design as beauty and Mr. Northrup believes that a great deal still remains to be done in this connection, especially for the benefit of the driver. Clear vision is essential not only to the immediate front but to the sides and rear as well. To obtain this, Mr. Northrup believes that windshields should be wider, pillar posts narrower, front doors wider and front seats wider so that three persons can be carried on them not only comfortably but without interfering in any way with the driver's operation of the car.

In connection with wider front seats, Mr. Northrup sees no reason why treads in general should not be increased so that more comfortable accommodations can be provided without the makeshifts that are sometimes necessary under present conditions.

While granting that exterior designs have changed greatly during recent years, Mr. Northrup maintains that interior designs have remained practically stationary. He believes one would find it difficult to distinguish between an interior of 1918 and one of 1928 except that the latter would contain a greater number of gadgets, bric-a-brac and similar excrescences:

Mr. Northrup likened the interior of a car to a living room in a home and pointed out that while in the latter all necessary conveniences are readily available, good design does not thrust them upon one's notice at all times. This he believes to be the major fault of interior designs. Granted that many appendages are necessary to serve the possible desires of the occupants, they should be so designed that they blend in their surroundings and become much less

prominent than many are now. Subdued effects should be sought in interiors, according to Mr. Northrup.

Turning to general body types, Mr. Northrup said that roadster bodies would probably continue to be popular. The rumble seat would receive much better protection from the elements than it does at present but the desire for this general type of body will continue, he believes.

He sees little hope for the progress of "sunshine" bodies which have attained considerable popularity in Europe and in England particularly. Our collapsible sedan bodies serve the requirements of American car owners much better than sunshine types, according to Mr. Northrup.

Body Design Ideals

IN Mr. Northrup's opinion, the ideal car, from the standpoint of body design, would have—

- **¶ Fewer "gadgets," with those that are retained made less conspicuous.**
- **¶ Body designed from stem to stern for harmonious ensemble effect.**
- **¶ A radiator which would allow the horizontal lines of the car to be swept to a point in front.**
- **¶ Wider windshield, narrower pillar posts, wider front doors and roomier seats.**
- **¶ Wider tread, if necessary, to provide more commodious interiors.**
- **¶ A subdued effect in interior treatment.**

The coach type body is due for considerable improvements, Mr. Northrup believes. Heretofore the object has been generally to reduce the cost of this body type as much as possible but its real utility value will bring it more consideration in the future and make it much better adapted to the needs of its owners. The doors will be made much wider so that occupants of the rear seats can get in or out with less disturbance to front seat occupants; the front seats will be made more comfortable and similar developments will be made to render this popular body type much more comfortable than it is now.

Some very interesting comments on the use of color in body design were made by Paul Thomas of Cheney Bros., and F. D. Willoughby, president of Willoughby Co. Mr. Thomas emphasized the importance of considering the psychological effect of color and cited as an example the different effects which may be obtained by the way colors are graded from top to bottom or from front to back.

Effect of Spaciousness

To a person in the interior of a car in which the colors are graded from dark at the rear to light colors in front an effect of spaciousness will be given, while with an opposite treatment he will have the feeling of traveling constantly through a long tunnel. Likewise colors graded from dark at the bottom to a light top gives an impression of spaciousness, while gradations in the opposite direction have a particularly depressing effect upon the occupant.

Mr. Thomas believes that more attention should be given to the particular effect or result desired in a car design and the color treatment based on this rather than upon ephemeral style values.

Mr. Willoughby carried this a step further by stating that his company is carrying color ideas back into the design of panels, etc. The usual custom, he said, is to design panels, reveals, moldings, etc., and then decide upon what colors will be used to make them look the best. Willoughby Co. is taking color considerations in view in the design of panels and moldings. Exact colors are not being considered but color families are kept in mind as lines and shapes take form on the drafting boards so that the two may be in the closest possible harmony.

Mr. Willoughby summed up the present trend among the most progressive car designers when he said "style is relative; beauty is everlasting." Trying for effects, making use of unusual colors and designs just to be different, and steps of like nature were criticized by all three speakers. They all emphasized the fact that a beautiful car is one which has been designed from the very beginning with the single thought in mind of harmonizing all the elements of the design into a unified whole; that freak designs rarely are beautiful and, finally, that the general public has a much better appreciation of art as applied to car design than is usually supposed.

Mr. Northrup believes that the straight lines and planes of modern art will find a place in interior decorations of cars and forecasted that the first steps in this direction will be in evidence in some of the exhibits at the New York Salon next month.

John Walker of the Mack Co., read a paper on commercial car body design in which he emphasized the need for more consideration of the appearance of truck cabs and bodies. Under present conditions, he said, because chassis and bodies are frequently designed and built by different agencies it is unusually difficult to obtain very pleasing effects. As truck makers and operators realize the advertising value in good-looking vehicles these points will receive more attention and real improvement may be expected.

Mr. Walker used a number of slides showing various designs of truck bodies ranging all the way from very horrible examples of what not to do, to some very good-looking jobs in which the chassis, cab and truck body had all been blended into a unified design of unusually pleasing appearance.

A new type of automobile finishing material—preoxydized oil enamel—was described by Mr. Scott of the Glidden Co. This material has been developed for applications where speed of application is desirable but where the conditions to which the finish is subjected make an elastic film necessary. This is particularly true of large truck bodies and cabs in which there is considerable weaving and straining which is very likely to crack and destroy the film.

The new material contains almost as much oil as the old-time oil enamels so that the resulting film is elastic and can be used successfully on surfaces subjected to constant weaving. The oils have been preoxidized, however, so that the drying time required for the various coats is very little longer than that required for cellulose lacquers.

Mr. Scott also described the Weatherometer, an instrument developed by his company for obtaining accelerated aging tests on various finishes. Ultraviolet rays are employed to simulate the destructive force of sunlight, and the cylinders in which the coated panels are placed for test can be kept at any desired degree of temperature and humidity to correspond with any desired weather conditions.

First with the News

Reliable and Accurate

News of the Industry

PAGE 772 VOLUME 59 *Philadelphia, Saturday, November 24, 1928* NUMBER 21

Production Total Lower Due to Seasonal Factors

PHILADELPHIA, Nov. 24—Easing of manufacturing schedules in car and truck producing factories is continuing in November, indications being that output for the month will show a decline of approximately 20 per cent from the October total. Manufacturing changes in a number of large producing factories preparing for 1929 production is in the main responsible for the reduction though practically all factories are operating on lower late-year schedules.

Retail sales have declined seasonally in nearly all sections of the country but in the aggregate they are on a considerably higher level for the season than in recent years. Dealers are devoting a large part of their effort to moving used cars, and this, with reductions in prices on some new car lines to move local stocks, is affecting the normal retail sales movement.

The opening of the active sales season in a number of leading foreign markets will tend to offset the late year slackening in the domestic market. Increased business has already been noted following the leading European shows. The consolidation of the Ford holdings in Europe into a new company with shares partly held publicly, and the extension by General Motors of its European holdings, will have important bearing in the promotion of European business by these companies.

Durant to Make Lansing Automotive Headquarters

NEW YORK, Nov. 22—Headquarters of the sales and manufacturing divisions of Durant Motors, Inc., will be moved from Elizabeth, N. J., to Lansing, Jan. 1, with the completion of the new $1,250,000 manufacturing buildings there. The executive offices will remain in New York and operations will continue in the Elizabeth plant until operations are under way at Lansing in January. Equipment is now being installed in the Lansing plant so as to be ready for operations before Jan. 1.

British Companies Merge

NEW YORK, Nov. 21—Word has been received here of the merger of the Hillman Motor Car Co., Humber, Ltd., and Commer, Ltd., into a new company to be known as Humber, Ltd., with a capital of $6,250,000.

M. & E.A. Index 188, Record Quarter Seen

NEW YORK, Nov. 22—New high records in production and sales for a year's business in automotive parts and accessories will be established by the close of 1928, according to the Motor & Accessory Manufacturers Association. Present indications point to the greatest fourth-quarter that industry has ever experienced. October indices, with the single exception of accessories, are above those of October, last year.

The grand index of all commodities listed in this general classification for October was 188. This compares with 129 for October, 1927, and with 202 for September, this year. Original equipment index for October was 200 as compared with 124 in October, last year, and with 218 in September, this year.

Replacement parts show an index of 184 as compared with 185 in September and 174 in October, last year. Shop equipment registered an index of 141, an increase over September, this year, when the index was 140, and an advance of 21 points over October, last year, when the index was 120. Sales of accessories to the wholesale trade continued low at 91 as compared with 103 a year ago and with 122 in September, this year.

Orders now on the books of original equipment manufacturers indicate largely expanded car production for the early part of 1929.

Autopulse Buys Pump

DETROIT, Nov. 19—The Autopulse Corp. has purchased the machinery, tools, stock and good will of Autopulse electric fuel pump from the Ireland & Matthews Mfg. Co. The corporation will move to its new factory Dec. 5.

Advertisers to Add 20% to Appropriations

ATLANTIC CITY, Nov. 20—An average increase of 20 per cent in the advertising appropriations of many leading industrial and business concerns in 1929 was forecast by W. A. Hart, retiring president of the Association of National Advertisers, at its annual convention here. Mr. Hart is advertising manager of E. I. duPont de Nemours & Co., Inc. Reported decreases in appropriations by some companies, he said, signify a more intelligent application of advertising monies.

Matheson, Lee and Peed Take New Sales Posts

DETROIT, Nov. 22—In a reorganization of sales executives preparatory to the launching of an intensive sales development program, J. E. Fields, vice-president in charge of sales of the Chrysler Corp., today announced the appointment of C. W. Matheson as general sales manager of Dodge Bros. Corp., the naming of John R. Lee as assistant to Mr. Fields, and the placing of Roy G. Peed as general sales manager of De Soto Motors Corp.

Mr. Matheson will continue as vice-president and director of De Soto though returning to the executive sales post in Dodge Brothers, where he was for several years an outstanding figure. Mr. Lee, relinquishing the Dodge sales post, will work with Mr. Fields in the development of sales policies and in direction of the general executive organization within the several Chrysler divisions. Mr. Peed until recently was general sales manager of Willys-Overland Co.

Grandjean Leaves Ford

DETROIT, Nov. 21—Philip W. Grandjean has resigned as secretary and assistant treasurer of the Ford Motor Co. of Canada, Ltd. Mr. Grandjean joined the company 15 years ago as chief accountant and 10 years ago was made secretary. No other changes are contemplated, according to W. R. Campbell.

October Production Increased to 417,354

Ten Months' Output Now Exceeds 1926 Record Period by 63,548

PHILADELPHIA, Nov. 22—Production of cars and trucks in the United States and Canada in October totaled 417,354, according to Department of Commerce report. This compares with 436,476 in September and with 227,430 in October last year. Production for the first 10 months is increased to 4,090,197 as against 3,302,716 in the first 10 months last year, and with 4,026,649 in the first 10 months of 1926.

Production of cars in U. S. plants in October was 341,705 against 358,872 in September and 183,042 in October last year. Truck production in the U. S. in October was 57,113 as against 56,411 in September and 36,640 in October last year. Car production in the U. S. in the first 10 months was 3,405,942 as against 2,730,760 in the same period last year. Truck production in U. S. factories in the 1928 period was 463,067 against 402,625 last year.

Canadian production of cars and trucks in October this year was 13,016 and 5520 respectively, against 16,572 and 4621 respectively in September and 6236 and 1512 respectively in October last year. Canadian car production in the 10 months' period was 181,849 against 139,420 last year; truck production in the 10 months was 39,339 against 29,911 last year.

Macauley Given Dinner by Packard Associates

DETROIT, Nov. 20—Alvan Macauley, president of Packard Motor Car Co., was tendered a dinner this week by associates in the company at the Detroit Club at which he was given a bronze clock and a leather-bound vellum expressing appreciation of his efforts and commemorating the occasion. Those present were H. E. Bodman, J. G. Vincent, E. F. Roberts, H. W. Peters, vice-presidents; M. A. Cudlip, vice-president and secretary; Milton Tibbets, patent counsel; H. J. Ferry, treasurer; B. C. Budd, export manager; J. J. Marks, comptroller; J. H. Marks, purchasing agent; A. Moorhouse, chief engineer; J. E. Locher, factory manager; Alvan T. Fuller, Lee J. Eastman, R. B. Parker and Ira L. Berk, distributors, and Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

AC Promotes McGarvey

DETROIT, Nov. 21—K. K. McGarvey, secretary of the engineering department of AC Spark Plug Co. at Flint for the past three years, has been appointed to the AC equipment sales engineering staff with headquarters in Detroit.

Ten Months' Total Rises to 4,090,197

1928	Cars	Trucks	Total
Jan.	212,351	27,840	240,191
Feb.	301,466	34,834	336,300
Mar.	387,044	43,752	430,796
Apr.	385,394	48,921	434,315
May	405,627	54,098	459,725
June	381,963	43,232	425,195
July	358,914	58,388	417,302
Aug.	424,867	67,676	492,543
Sept.	375,444	61,032	436,476
Oct.	354,721	62,633	417,354
Total	3,587,791	502,406	4,090,197

1927	Cars	Trucks	Total
Jan.	211,395	42,889	254,284
Feb.	278,997	44,393	323,390
Mar.	365,754	52,009	417,763
Apr.	379,572	51,421	430,993
May	380,716	50,640	431,356
June	297,090	45,935	343,025
July	246,530	33,853	280,383
Aug.	285,724	36,796	322,520
Sept.	235,124	36,448	271,572
Oct.	189,278	38,152	227,430
Total	2,870,180	432,536	3,302,716
Nov.	114,931	26,056	140,987
Dec.	108,317	28,360	136,677
Total	3,093,428	486,952	3,580,380

Coercion of Dealers Opposed by N.A.F.C.

NEW YORK, Nov. 21—Charges that some automobile factories were "coercing" dealers into use of the instalment credit facilities offered by finance companies owned by these manufacturers or having contractural relations with them, made at the Fifth National Financing Conference held by the National Association of Finance Companies in the Hotel Roosevelt, led to the passing of a resolution opposing the alleged practice and to the suggestion of a court test of the legal aspects of the question.

This suggestion was made by John W. Creekmur, general counsel of the association, who, however, declared that he was speaking as the representative of one of the member companies, the National Bond & Investment Co. of Chicago.

A. G. Rumpf, president of the Motor Dealers Credit Corp., Studebaker financing subsidiary, and George M. Graham, vice-president, Willys-Overland Co., both denied that any coercive measures had been used among their dealers.

Milan V. Ayres, economist of the association, pointing out that future increases in the domestic market for automobiles would be small, urged finance companies to diversify their activities. Various aspects of the banking and credit situation were discussed by George E. Roberts, vice-president, National City Bank, and O. F. Meredith, vice-president, Foreman National Bank, Chicago.

Model Changes Cut G.M. October Sales

Retail Sales for Month Total 120,876 Against 167,460 in September

NEW YORK, Nov. 23—Retail sales of General Motors' cars in October totaled 140,883 as against 148,784 in September and 153,833 in October last year. Division sales to dealers totaled 120,876 in October against 167,460 in September and 128,459 in October last year. Reductions in October are ascribed to changes in Chevrolet and Oakland. November production and sales are expected to be affected also by these changes.

Comparative totals follow:

Dealers Sales to Users

	1928	1927
Jan.	107,278	81,010
Feb.	132,029	102,025
Mar.	183,706	146,275
Apr.	209,367	180,106
May	224,094	171,364
June	206,259	159,701
July	177,728	134,749
Aug.	187,463	158,619
Sept.	148,784	132,596
Oct.	140,883	153,833

Divisions Sales to Dealers

	1928	1927
Jan.	125,181	99,367
Feb.	169,232	124,426
Mar.	197,821	161,910
Apr.	197,597	169,067
May	207,325	173,182
June	186,160	155,525
July	169,473	136,909
Aug.	186,653	155,604
Sept.	167,460	140,607
Oct.	120,876	128,459

Change Viewed Unlikely in G.M. Official Group

NEW YORK, Nov. 21—Recent rumors that Alfred P. Sloan, Jr., is to become chairman of the board of General Motors and Fred J. Fisher is to succeed him as president upon investigation seem to have little foundation in fact. These rumors were based primarily upon the future relations between duPont interests and General Motors, and more specifically upon the question as to whether Pierre S. duPont would retain his position as chairman of the board.

The question of his relinquishing this position arose during the recent political campaign and was the result of his stand on certain issues in the campaign. At that time Mr. duPont considered that the stand he had taken might prove embarrassing to the board of directors and had tendered his resignation as chairman. His resignation was not accepted at that time and he was granted a leave of absence, presumably for the duration of the campaign. Now that the campaign has closed there seems little reason to suppose that he will not resume the chairman position.

Comparative Table of Old and New Rates Under Massachusetts Liability Insurance

	Terr. 1		Terr. 2		Terr. 3		Terr. 4		Terr. 5	
	Old	New	Old	New	Old	New	Old	New	Old	New
W—Cars	$29	$47	$29	$31	$22	$25	$21	$22	$16	$14
X—Cars	37	47	37	31	27	30	23	27	20	21
Y—Cars	45	62	45	38	34	37	35	34	25	28
Electrics	19	19	19	19	15	15	15	15	11	11
Motorcycles—Two wheels	19	47	19	31	15	25	21	15	11	14
Motorcycles — More than two wheels	29	47	29	31	22	25	21	22	14	16
TRUCKS										
Class 2—Heavy	212	184			103	90			59	52
Medium	194	169	Same		94	82	Same		54	47
Light	158	138			77	67			44	39
Class 3—Heavy	151	132	as		74	64	as		42	37
Medium	113	98			55	48			32	27
Light	85	74	Terr.		42	36	Terr.		24	21
Class 4—Heavy	107	93			52	45			30	26
Medium	85	74	One		42	35	Three		24	21
Light	58	50			28	24			16	14

W—Small cars. X—Medium cars. Y—Larger cars.

Territory 1—Boston and adjacent cities.
Territory 2—Quincy and Newton and a group of suburban cities and towns.
Territory 3—Beverly, Brockton, Haverhill, Lawrence, Lowell, Lynn, and a group of cities and towns in the eastern part of the state.
Territory 4—Fall River, New Bedford, Worcester, Springfield and adjacent cities and towns.
Territory 5—The rest of the state.

Bay State Increases Car Liability Rate

BOSTON, Nov. 19 — Revisions of premium charges for compulsory automobile liability insurance in Massachusetts, under which the rates on passenger cars are increased in most classes and rates on commercial vehicles are reduced, will be contested in the courts under plans of independent and organized car owners.

The new schedule establishes five rating territories as compared with three under the former schedule. Rates as established are 10 per cent lower than the rates proposed by former Insurance Commissioner Monk, the dispute on which led to his resignation. Acting Commissioner Linnell, who issued the new rates and which are effective on policies for 1929, said he was convinced the rates under which the insurance companies were obliged to operate in 1927 and 1928 were inadequate to produce necessary revenue.

Governor Fuller, in a statement incident to the promulgation of the new rates, said that fraudulent claims that have been permitted under the workings of the compulsory insurance law call for a change in the law. Otherwise, he said, the people of the state will demand a state fund.

Issuance of licenses for 1929 is now expected to go forward but an attempt is indicated to hold the increase in insurance funds in escrow pending court determination.

Restrains Insurance Companies

CONCORD, N. H., Nov. 17—The New Hampshire Supreme Court has upheld the right of the state insurance commissioner to prohibit insurance companies from increasing the rates on automotive policies in this state. As a result some $60,000 collected by insurance companies, while the suits were pending, will be paid back to policy holders as being the increased rates that the commissioner refused to approve.

St. Louis Car Sales Gain, Trucks Show Slight Drop

ST. LOUIS, Nov. 19—According to statistics compiled by the St. Louis Automobile Dealers' Association for the first 10 months of 1928 there were 5402 more passenger cars sold in the city and St. Louis County than during the similar period in 1927. Truck sales failed by 37 vehicles to equal the number sold during the first 10 months of 1927. The total number of passenger cars sold was 29,342, of which 24,190 were registered in the city. During the first 10 months of 1927 the passenger car sales reached 23,940. Truck sales during the 10-month period this year were 2940, compared with 2977 in 1927.

N. Y. October Sales 11,098

NEW YORK, Nov. 17—Sales of new passenger cars in the metropolitan district in October totaled 11,098 as against 11,807 in September and 8356 in October last year, according to Sherlock & Arnold. Sales for the first 10 months totaled 132,620 as against 105,664 in the 1927 period.

New Jersey Sales Higher

NEW YORK, Nov. 20—New car sales in New Jersey during October amounted to 7977, according to Sherlock & Arnold. This compares with 6571 in October of 1927 and with 9772 in September, this year. Sales for the first 10 months of 1928 amounted to 97,788 and compare with 72,834 for a like period in 1927.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Nov. 22—Some lines of trade are experiencing the usual fall stimulation, but general business activity would be much more marked if it were not for the abnormally high temperatures throughout the country.

COTTON CONSUMPTION

Cotton consumption in October amounted to 618,788 bales of lint and 76,093 bales of linters, as compared with 613,520 bales of lint and 75,330 bales of linters in October, 1927, making a combined increase of 16,031 bales, or 2.3 per cent above the total consumption during October last year.

FREIGHT CAR LOADINGS

Car loadings for the week ended Nov. 3 totaled 1,103,342 cars, which marks an increase of 64,267 cars above the figure for the corresponding week in 1927, but a decrease of 28,490 cars under that for the similar period two years ago.

FOREIGN TRADE

Merchandise exports during October reached the highest monthly figure since 1920, amounting to $555,000,000, as compared with $421,748,000 in September and $488,675,000 in October, 1927. Merchandise imports increased slightly in October, but the total imports for the first 10 months of this year are less than those in the corresponding period in either of the two preceding years.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Nov. 17 was 97.7, which compares with 97.6 the week before and 97.9 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City in the week ended Nov. 14 were less than 1 per cent below those for the similar period a year ago.

FEDERAL RESERVE REPORT

The banking situation as a whole reflected a certain degree of credit contraction in the week ended Nov. 14. The reporting Federal Reserve member banks showed for that week decreases of $83,000,000 in loans and discounts, of $14,000,000 in investments, and of $96,000,000 in borrowings from the Federal Reserve banks. The consolidated statement of Federal Reserve banks for that week showed a decrease of $100,000,000 in discounted bills and increases of $25,800,000 in bills bought in the open market and of $34,700,000 in member bank reserve deposits.

Eclipse to Double Plant

DETROIT, Nov. 19—According to R. G. Michell, general manager, the Eclipse Interchangeable Counterbore Co. will let contracts soon for practically doubling their present factory floor space and machine capacity.

Chrysler Earnings Rise to $10,095,797

Profit in First Nine Months Totals $21,786,276—Assets 3.27 to 1

DETROIT, Nov. 20—Chrysler Corp. in the third quarter earned net profit of $10,095,797 after all charges including those on the recently assumed notes and debentures of Dodge Brothers, Inc. This was equal to $2.29 a share on common stock, including the new stock issued in connection with the purchase of Dodge Brothers. In the previous quarter, with Dodge Brothers excluded, the net was $6,988,013 or $2.41 a share, and in the third quarter last year it was $6,105,137 or $2.10 a share.

Net profit in the first nine months this year was $21,786,276 or $4.94 a share on common, this including the Dodge Brothers earnings for only part of the period. Chrysler net in the first nine months last year, Dodge Brothers not included, was $16,221,886 or $5.51 a share.

The balance sheet as of Sept. 30 shows current assets of $120,021,813 of which $59,982,947 was in cash and securities, while current liabilities were $36,659,273, a ratio of 3.27 to 1. Net current assets are shown as $83,362,539 against $46,068,362 on June 30, before the purchase of Dodge Brothers. Net current assets exceeded the bonded debt by more than $23,000,000.

Stewart-Warner Net $5,476,974

NEW YORK, Nov. 17—Stewart-Warner Speedometer Co. reports net profit for the nine months ended Sept. 30 as $5,476,974. This is equivalent to $9.13 a share and compares with profit of $4,198,633, or $6.99 a share, for the corresponding period of 1927. Net profit for the quarter ended Sept. 30 was $1,863,640, equivalent to $3.10 a share, as compared with $1,627,707, or $2.71 a share, in 1927.

Federal-Mogul Net $371,634

DETROIT, Nov. 17—Federal-Mogul earnings for the first nine months of this year were approximately $371,634 after all charges and provision for Federal taxes, equal to over $2.85 per share on the 130,000 shares of common stock outstanding.

Marmon Earnings $1,780,448

NEW YORK, Nov. 17—Marmon Motor Car Co. reports net profit for the 10 months ended Oct. 31 as $1,780,448 before taxes. October earnings totaled $215,934.

Coast Salon Aids Sales

LOS ANGELES, Nov. 20—The fifth annual automobile salon of the Los Angeles Motor Car Dealers Association which has just closed was an outstanding success, according to Secretary Burt Roberts, who reports a larger attendance than at any previous salon and with real results in net sales. There were 50 exhibits in all, and many of the exhibitors changed models every day of the three days' showing.

Home—and At Home

Robert C. Graham, vice-president in charge of sales of Graham-Paige Motors Corp., returning from Europe where he attended the Paris and London shows and was host to dealers representing 80 countries at dinners held during these shows. With him are his sons, Ziba and Charles

Fandango to Maintain Prices

NEW YORK, Nov. 17—With the announcement of its 1929 line of automobile seat and interior covers, Fandango Products of New York, Inc., has announced a new departure in its merchandising policy. Three points characterize this policy, namely: Selective jobber distribution, rigid retail price maintenance and elimination of stock risks through regular rotation of inventory.

Pierce-Arrow Exports Show Gains Over 1927

Pierce-Arrow Motor Car Co. exports for the present year show a decided gain over 1927. Exports to Holland, Japan, South America and Switzerland were, in some cases, 400 per cent greater than any previous year. A number of new territories were opened up during the present year, including Portugal, Porto Rico, Panama and Rumania. Truck shipments to Russia were especially heavy.

Australia, the Argentine, Brazil, England, Finland, Germany, Guatemala, the Philippines, Spain and Venezuela have bought heavily during the present year.

Men of the Industry and What They Are Doing

Stutz Motor Car Adds Five District Managers

Preparatory to enlarged production plans the Stutz Motor Car Co. of America, Inc., has added five new district sales managers, it was announced by E. R. Parker, general sales manager. The new Stutz field representatives are F. K. Maitland, James F. Boyd, Edward M. Knoff, Jules Ellingboe and H. H. Hevey.

Mr. Maitland will serve as a special factory representative. He has been associated with Willys-Overland, Chandler and Studebaker. Mr. Boyd was connected with Willys-Overland, Inc., and with Dodge Brothers, Inc. Mr. Knoff has been associated with Pierce-Arrow, Chandler and Willys-Overland.

Jules Ellingboe has piloted a race car six times in the international 500-mile race on the Indianapolis speedway and has engaged in many other speed contests throughout the country. For four years, Mr. Ellingboe was wholesale manager for the Hudson-Essex distributor in Memphis, and during the last year has been sales manager for the Chrysler distributor in the same city. Mr. Hevey has been with Marmon, Chandler, Studebaker and Overland.

Moock Joins H. M. Ballard

Harry G. Moock has been made vice-president in charge of merchandising of H. M. Ballard, Inc., Chicago distribution engineers. Mr. Moock recently resigned as managing director of Greater Marketing Division of the Automotive Equipment Association. Previously he was sales manager of Hudson Motor Car Co. and general manager of National Automobile Dealers Association.

Murray Promotes Westrope

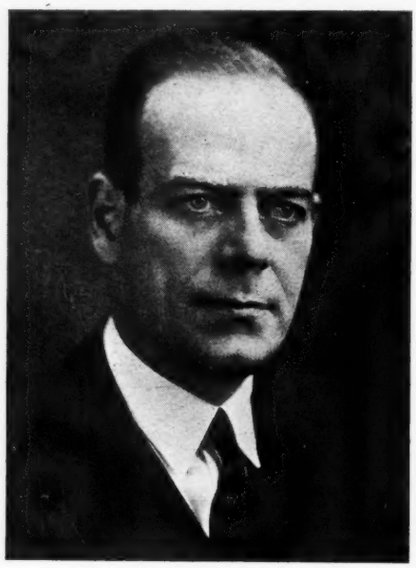
Otto F. Graebner, chief engineer of the Murray Corp. of America, has announced the promotion of Fred J. Westrope to the position of assistant chief engineer. Mr. Westrope who has been body engineer of Murray, entered the automobile body business in 1910, and has served in various engineering capacities with Wilson Body Co., Towson Body Co. and the Briggs Mfg. Co.

Dyer Heads Advertisers

Carlton Dyer, advertising manager of the Ford Motor Co. of Canada, Ltd., has been elected president of the Association of Canadian Advertisers at the recent annual conference.

Callahan Goes With Curtiss

J. A. Callahan has resigned as vice-president and general manager of the Martin-Parry Corp. to become factory manager of the Curtiss Aeroplane & Motor Co., Inc., Buffalo.



Heads Elcar Sales

Todd O. Kellogg, who has resigned from Willys-Overland to become vice-president in charge of sales for Elcar

Butler Regional Manager

R. L. Butler has been named regional manager of the Pacific Coast States for Willys-Overland Co. with headquarters at the new Los Angeles assembly plant. Mr. Butler has been zone manager of the Toledo territory for six years and he has been succeeded there by Harry R. Henry, retail sales manager of the Toledo branch.

Gates Joins Baker Staff

A. J. Gates has been appointed chief sales executive in charge of the national distribution of Baker industrial tractors, trucks and cranes, with headquarters at the home office of the Baker-Raulang Co., Cleveland. Mr. Gates has been associated with the company for 10 years as distributor.

Firestone Promotes Brodt

Burton W. Brodt, formerly manufacturers' sales department representative of Firestone Tire & Rubber Co. at Detroit, has been transferred to Akron as manufacturers' sales manager. E. M. Clissold, formerly purchasing agent, has been transferred to the Detroit office as manufacturers' representative.

Heffron Goes to Detroit

Arthur D. Heffron, Jr., has been transferred from the Chicago office of the Globe Steel Tubes Co., Milwaukee, to the Detroit office, where he will be assistant manager of sales.

Kettering Describes Work to Improve Fuel Efficiency

C. F. Kettering, vice-president of General Motors Corp., addressed the autumn meeting of the National Academy of Sciences at Union College, Schenectady, Nov. 9. He told of experimental work being carried on with combustion fuels with a view of increasing their efficiency. If some of these experiments are successful the efficiency of the fuel supply should be doubled, Mr. Kettering pointed out. Chemical study of fuels has shown that the presence of certain substances by increasing knock tendency decreases the efficiency of the fuel. Considerable progress has been made, he said, in rearranging the organic structure of fuels so as to eliminate these substances as much as possible.

Dr. E. F. W. Alexanderson, consulting engineer of the General Electric Co., also told of experiments with radio air-sounding devices which, when perfected, will enable an aviator to determine his exact altitude over the ground at any time during flight.

Mooney to Present Film

J. D. Mooney, president of General Motors Export Co., is issuing invitations to a premiere showing of the motion picture, The World Builds a Motor Car, to be held Dec. 11 at Mecca Temple, New York. This film was produced by the export company for exhibition to the overseas field and was shown at a recent board meeting.

Haresnape Rejoins A.A.A.

Val Haresnape has been reappointed secretary of the contest board of the American Automobile Association. Mr. Haresnape resigned this position early this year to become Eastern representative for a leading car manufacturer.

Belden Patents 2 Engines

Edward H. Belden, head of Belden Patents, Inc., Toledo, and formerly chief engineer of the Willys-Overland Co., has patented two new automotive engines. One is a sleeve-valve two-cycle engine and the other a counter-balanced piston engine.

Steele General Manager

E. B. Steele has been appointed general manager of the Pickard Trunk Co., Inc., Livonia, N. Y., where he will direct a program of expansion.

Hancock on N.S.P.A. Board

W. G. Hancock, of the McCord Radiator & Mfg. Co., was elected to the board of directors of the National Standard Parts Association. He succeeded W. P. Smith, Spencer-Smith Machine Co.

Cincinnati Executives Join Plane Industry

Organize Company to Manufacture Aircraft Under Dietz Patents

CINCINNATI, Nov. 17—Application has been filed for an Ohio Charter by the Aeronautical Corp. of America, this city. Manufacturing rights, designs and patents of the Dietz Experimental Laboratories in Dayton, have been acquired by the company, which is composed of a group of Cincinnati business men, including John Omwake, president of the U. S. Playing Card Co.; W. A. Draper, president of the Cincinnati Street Railway Co.; J. J. Castellini, president of the Brotherhood National Bank; D. C. Keller, president of the Dow Drug Co.; Bolton Armstrong, president of the Mabley & Carew Co.; J. M. Richardson, president of the Richardson Co.; Robert A. Taft, attorney; E. B. Stanley, president of the American Laundry Machinery Co.; Taylor Stanley, secretary of the American Laundry Machinery Co., and J. J. Gilligan, president of Gilligan & Sons.

The company will manufacture airplanes, airplane engines and equipment and will be under the active management of C. G. Dietz. Robert Galloway of Dayton, formerly with Curtiss Aeroplane & Motor Co., Packard Motor Car Co. and the U. S. Air Service, will be chief production engineer, and George Roche, aeronautical engineer of the Air Service of the U. S. Army, will be chairman of the technical advisory board. The new plant, 100 x 300 ft., will be located on the municipal airport at Lunken Field and work on the erection of the factory building will begin immediately.

Bankers Buy Travel Air

NEW YORK, Nov. 17—Purchase of control of the Travel Air Mfg. Co., airplane manufacturer with plant at Wichita, Kan., by Hayden, Stone & Co., and Jackson & Curtis, New York banking houses, led to report in financial circles that the company was to be merged with Keystone Aircraft Corp. which recently acquired control of the Loening Aeronautical Engineering Corp. No announcement on the proposed merger has been made.

Federal Promotes Ruddon

DETROIT, Nov. 19—R. W. Ruddon has been appointed first vice-president and general manager of the Federal Motor Truck Co. Mr. Ruddon entered the company 15 years ago as secretary to Mr. Pulcher, president of the company, and in 1918 he became assistant secretary. Early this year he became first vice-president.

Walter S. Hanna

COLUMBUS, Nov. 17—Walter S. Hanna, president and founder of the Columbus Varnish Co., died Nov. 3.

Heads Export Unit

E. C. Morse, president and general manager of the new Chrysler Export Corp.

Automotive Dollar Rises to Value of 108.7 Cents

WASHINGTON, Nov. 22 — Based upon the average purchasing power of a dollar for all wholesale commodities, the dollar bill invested in an automobile in October, 1928, would buy 108.7 cents worth of machinery. In 1926 the dollar would buy but 92 cents worth, according to the reports of the Bureau of Labor Statistics.

On the same basis, the value of automobiles purchased by a dollar in October of this year did not fluctuate from the September level, but was much more than the October, 1927, level of 102.2.

A general drop in wholesale prices of commodities with farm prices in the lead gave much greater purchasing power to the average dollar bill of the consumer during October, 1928, the bureau points out.

Traffic Managers Meet

DETROIT, Nov. 19—Traffic managers of the National Automobile Chamber of Commerce met in the N.A.C.C. offices in Detroit last week. In addition to current freight classification matters, the discussion included freight claim prevention as effected by the method of loading automobiles in freight cars at factories, and a study of rating data developed by a survey of more than 30,000 carload shipments of automobiles to various parts of the country.

Rubber Makers to Meet

TRENTON, N. J., Nov. 19—The Rubber Manufacturers Association of New Jersey, composed of prominent tire and mechanical goods manufacturers, will hold its annual meeting here in December.

Financial Notes

Wagner Electric Corp. will submit to stockholders Nov. 27 two proposals for changes in its certificate of incorporation. The first is to increase from 60,000 to 100,000 the no-par common shares, stockholders to be entitled to purchase one new share at $80 for each four shares held. Proceeds of the sale of this stock will be used to retire on Feb. 1, 1929, the $1,599,200 of bonds outstanding. The second proposal is to exchange four shares of $15 par stock for each outstanding share of no-par stock, bringing the company's capital structure to 400,000 shares of the new $15 par value stock in addition to the present 30,000 shares of $100 par 7 per cent cumulative preferred of which 15,000 shares are outstanding.

E. I. du Pont de Nemours & Co., Inc., has voted to split the company's stock on the basis of 3½ shares of new for each common share now outstanding. In addition, an extra cash dividend of $4.75 and a regular quarterly dividend of $2.50 has been declared. Of the extra $3.55 represents an amount accruing to each du Pont share from the recent extra payment of $2.50 on common stock by General Motors.

General Foundry & Machine Co. reports earnings for the first nine months ending Sept. 30, of $222,726 after depreciation and Federal income tax. This amounts to $7.42 per share on 30,000 shares of class "A" outstanding and after the payment of dividends on the class "A," which are at the rate of $2.25 per annum, leaves over $2 per share on the 85,000 shares class "B" outstanding.

Doehler Die Casting Co. reports for the first nine months of 1928 a profit of $540,160 after charges but before Federal taxes, comparing with $353,397 in the corresponding period last year. Shipments in October exceeded $1,000,000, making the month the best in the company's history.

Ross Gear & Tool Co. reports for the first 10 months this year net profit of $715,539 after charges and Federal taxes, equal after dividend requirements on the 6 per cent preferred stock to $4.77 a share on the 150,000 shares of no par common stock.

Tire Sales $235,657,000

NEW YORK, Nov. 17—Total sales value of tire and tire sundry shipments in the third-quarter this year was $235,657,000 as against $197,079,000 in the preceding quarter, and against $223,488,000 in the third-quarter last year. Crude rubber consumed by the tire industry in the third-quarter was 93,173 tons as against 81,323 in the preceding quarter and against 69,369 in the third-quarter last year. The total crude rubber on hand was 68,729 tons, a reduction from the 87,771 tonnage at the end of the second quarter.

Auburn Orders 7000 Bodies

CHICAGO, Nov. 23—Auburn Automobile Co. has placed orders with Central Mfg. Co., body builders of Connersville, Ind., for 7000 bodies to be delivered within the next four months.

Higher Sheet Prices Await Buying Test

Advance of $2 Per Ton Now General—Metal Prices Rule High

NEW YORK, Nov. 22—A showdown on the first-quarter 1929 sheet market is hardly looked for before the middle of December. The leading interest's sheet-rolling subsidiary has followed the example of independents who earlier announced $2 per ton higher prices for the first quarter of 1929, thus making the advance in the asking price general. No business has so far been booked at the higher levels, and no real test is looked for until automotive consumers must more seriously bethink themselves of their late January and early February needs.

What with some slowing down in consumption as the result of annual inventories and the show season, it is quite likely that many automotive consumers will carry over from their 1928 steel purchases enough material into 1929 to take care of the first few weeks' operating schedules. For that reason very little attention was paid to announcement by some mills that the higher sheet prices would apply to prompt as well as first-quarter business. The object of this was to make it clear that the rolling mills expected to get $2 a ton more for first-quarter business rather than that they sought to fill their order books with a lot of nominally prompt shipment business at lower prices for material really intended for first quarter 1929 requirements.

Both the hot-rolled and cold-rolled strip-steel markets are definitely lined up for advances corresponding to those scheduled for sheets. Cold-rolled strip is now held at 2.85 cents, Pittsburgh. This price level is looked for to apply to large first quarter contracts, with the general run of business to be quoted on a 2.95 cents basis. There is talk of a further $1 per ton advance in sheet-bars, so as to restore the $1 differential over the price for billets and slabs that was in vogue earlier in the year.

Pig Iron—Iron ore is being rushed down the Lakes in record-breaking tonnages to supply the blast furnaces which are enjoying the first real spell in prosperity in some years. The market continues strong, with foundry and malleable base grades quoted at $17.50 @ $18, Valley furnace.

Aluminum—European reports regarding the position of the metal are conflicting. There is as much talk of the Cartel lowering prices as there is of the probability of prices being advanced in the London market early next year. The sole domestic producer's price for virgin metal remains entirely unchanged.

Copper—Predictions of still higher prices by some producers are being met by statements from others that further advances would involve too great a risk because they might not survive a period of dull demand. Demand for automotive brasses is of a routine character.

Lead—The market is quiet and steady.

Zinc—Galvanizers have been buying more freely. The market is firm at 6.25 cents, East St. Louis.

Export and Import Views on Markets Discussed at Overseas Club Meeting

NEW YORK, Nov. 17—Foreign markets for automobile parts and accessories and service equipment were discussed from opposite points of view at the regular monthly meeting of the Overseas Automotive Club at the Hotel Astor this week. European, South American and Philippine markets all came in for their share of discussion, some from the exporters' point of view and some from the importers' point of view, there being representatives present from all of these markets.

J. H. Dreibelbis, regional director for all of South America for General Motors Export Co., was the principal speaker. Taking as his topic The Outlook for the Automobile Industry in South America for 1929, Mr. Dreibelbis pointed out that South America needs education more than it does tools and accessories. The principal obstacles to more rapid advancement of trade in that continent are the vast distances, poverty and ignorance. This makes it exceedingly difficult to attempt to reach all portions of the market and General Motors has met this situation by a fleet of "rolling kitchens." These are trucks equipped with service tools and replacement parts, each carrying a crew of expert mechanics who travel around visiting the various dealers and instructing them in service work, frequently selling them the tools and parts with which the instruction has been carried on.

Other obstacles to be met with in South America to an even greater extent than in this country are the existence of trade pirates and the tendency toward price cutting. In order to cover the market as it exists today, the parts and tool manufacturer need reach only about a dozen populated points in the whole continent, as it is around these points that practically all the automobiles have been sold to date.

H. L. Kraus, who has just returned from a four weeks' trip in Europe, spoke briefly on the condition of business on the continent and pointed out that the aggressive sales policy of American automobile manufacturers had created a live market for parts and accessories, but expressed the fear that Germany, with France and Austria to a lesser degree, might soon be establishing their own manufacturing industries in this field and cutting into the market for American-made products.

This point of view was contradicted by S. Sobotka of Vienna who expressed himself as of the opinion that the American manufacturer could readily retain this market in the face of domestic competition. He pointed out that 60 per cent of the registration in Germany, for example, is of American-made cars and that the market for American tools and parts will, therefore, remain active. He analyzed conditions throughout the rest of Europe and drew the conclusion that there was a steadily growing market there for American products.

E. M. Bachrach of Manila discussed conditions in the Philippines from the importers' point of view. He took exception to some of the remarks which Mr. Dreibelbis had made with regard to American business methods in export markets. In the main he spoke very highly of American methods as opposed to European salesmanship but did criticise the American manufacturer in that, in his opinion, he failed to live up to the promises of his salesmen, whereas European manufacturers back their salesmen to the limit.

To Make New Truck Wheel

DETROIT, Nov. 17—The Michigan Steel Casting Co. is preparing to manufacture a new type of cast steel truck wheel for use with pneumatic tires. The wheel will be known as the Nelson wheel, having been designed by E. A. Nelson. L. L. Kinstler, formerly of the Erie Malleable Co., who handled the sales engineering work for the Van Wheel Corp., is in charge of sales development work.

Pines Plans $1,000,000 Plant

CHICAGO, Nov. 19—Purchase of a site for a new $1,000,000 plant has been announced by James F. Raleigh, president of the Pines Winterfront Co. The new plant will be about six times as large as the present plant.

Edward Ford Glass Spends $3,000,000 for Equipment

TOLEDO, Nov. 17—The Edward Ford Plate Glass Co. here will spend $3,000,000 to develop a new grinding and polishing unit for production of plate glass and laminated glass for the automotive trade. The company has installed the first unit using the Bicheroux casting process which will give it nearly 50 per cent increase in present capacity.

It will equip its grinding and polishing plant with equipment developed by Pilkington Brothers of England, and Charles Heuze, Belgian glass engineer, first of its kind in the United States.

The company's ultimate capacity will be nearly 30,000,000 sq. ft. of plate glass annually.

Auburn Places Releases

CHICAGO, Nov. 20—Auburn Automobile Co. has released material commitments for a production of 16,000 cars the first five months of 1929.

Cunningham Backs New Plane Company

New Corporation to Start Operations Jan. 1 in Part of Car Plant

ROCHESTER, N. Y., Nov. 17—The Cunningham-Hall Aircraft Corp., backed by the Cunningham automobile interests, has been organized to manufacture airplanes here. Space has been leased by the new corporation in the Cunningham automobile factory and operations in the actual manufacture of planes are expected to begin by Jan. 1. The new concern is capitalized at $350,000 with 3500 shares of preferred stock par value $100 and 10,000 shares of common no par value.

Officers of the corporation are: President, Francis E. Cunningham, secretary of James Cunningham & Sons Company; vice-presidents, J. C. Dryer and R. F. Hall; secretary, W. R. R. Winans, and treasurer, J. W. Fulreader.

W. T. Thomas, former vice-president of the Thomas-Morse Aircraft Corp., Ithaca, N. Y., will be consulting and directing engineer of the new corporation. Other prominent aircraft men formerly connected with the Thomas-Morse concern who will be actively identified with the new Rochester corporation include Mr. Hall, Mr. Winans, P. D. Wilson, P. F. Brown, F. J. Newlon and Mage Smith.

Parks Aircraft Factory to Build 2400 Annually

ST. LOUIS, Nov. 17—The new airplane factory of Parks Aircraft, Inc., is under construction. The main factory building, in which an initial annual production of 2400 cabin monoplanes is planned, is to be 101 by 580 feet and is to cost more than $150,000. Immediately adjoining the main building is to be the $65,000 dope and paint building.

The first two of the airplanes to be manufactured in the plant are nearly ready for test flight and are expected to take the air about Nov. 25. They are cabin monoplanes incorporating a special high lift wing which will make possible low landing speed. They are to be powered by engines of more than 200 hp.

Keystone Tests New Plane

BRISTOL, PA., Nov. 17—The Keystone Aircraft Corp.'s 20-passenger monoplane Patrician has completed a series of test flights. The plane is of all-metal construction with a 90-ft. wing spread and overall length of 63 ft. The cabin is 6 ft. wide, 19½ ft. long and has headroom of 6 ft. It is dual controlled and is powered by three Wright Cyclone engines of combined 1575 hp., any two of which will sustain flight. It has a cruising speed of 130 m.p.h., a top speed of 155 m.p.h. and a pay load capacity of 15,000 lb. with which it is capable of cruising for six hours.

Drafted

George E. Willis was drafted from the Studebaker Corp. of Australasia to head Pierce-Arrow sales

Savoia-Marchetti Planes to be Made in New York

NEW YORK, Nov. 19—The American Aeronautical Corp. has been formed in New York to take over manufacture of Savoia-Marchetti seaplanes in the United States. Organization of the company is being perfected and factories are expected to be located on Long Island. When the organization is complete, six planes will be imported from Italy, two four-engined 24-passenger flying boats, two smaller flying boats and two amphibians. Use of American engines is planned.

The Savoia-Marchetti is a cantilever monoplane with the fuselage and cabin built directly into the center wing section. The engines are in nacelles atop the wings.

Deere to Give Vacations

MOLINE, Nov. 17—Two weeks' annual vacation, with pay, for all employees of Deere & Co. was announced this week by the board of directors. Charles Butterworth, chairman of the board, is president of the United States Chamber of Commerce. The order will affect 4500 employees here and about 2500 others in branch factories and offices. The vacation periods will come, for the most part, during the time the plants are closed for annual inventory.

Ashco to Make Heater

ST. PAUL, Nov. 19—The Ashco Corp. has been capitalized at $25,000 to manufacture the automobile heater until recently made by the Moore Mfg. Co. of Waterloo, Iowa. The company is also to make valves and dash controls. G. A. Ashton, manufacturers agent, is president and treasurer. J. D. Burstein of Neenah, Wis., is secretary, and A. B. Ashton of St. Paul, vice-president.

Highway Officials Oppose Toll Bridges

Draft Memorial to Congress Against Further Granting of Franchises

CHICAGO, Nov. 17—Combined opposition of the highway officials of 45 states of the nation to the further granting of permits or franchises for privately owned and operated toll bridges on state or Federal Aid highways, was placed on record this week by the American Association of State Highway Officials, in convention at the Stevens Hotel.

The resolutions were drawn in the form of a memorial to Congress and signed by the following members of the resolutions committee, all of whom are chief executives of state highway departments: C. M. Babcock, Minnesota; L. D. Blauvelt, Colorado; Samuel Eckels, Pennsylvania; F. E. Everett, New Hampshire; W. R. Neel, Connecticut; Frank Page, North Carolina; Z. E. Sevison, Wyoming; F. R. White, Iowa, and T. H. MacDonald, of the U. S. bureau of public roads.

The consensus appeared to favor the plan being used in Kentucky as a solution of the toll bridge problem. In that state the highway department is empowered to finance bridge projects by bond issues against the improvement and to operate the utility as a toll bridge on a basis of charges which will permit retiring of bonds and freeing the bridge from tolls in a period of years.

W. C. Markham, secretary of the association, declared that the road building program throughout the country would certainly be vastly increased under the next administration because of Mr. Hoover's utterances in regard to roads during the campaign. The road officials viewed the continuance of prosperity as certain to reflect on their business.

The Federal appropriation of $83,000,000 should be doubled and that will probably be asked by resolution by the association, Mr. Markham said. In addition to increased Federal aid, the individual states are certain to increase their road funds enormously, he added, citing Iowa's $100,000,000 program and Missouri's $75,000,000 bond issue.

In spite of the increase in paved roads in the last 10 years, Mr. Markham said, not more than one-half of the Federal highways have hard surfacing. At the present time he said there are 24,000,000 automobiles in the country and 162,000 miles of paved roads.

Independent Tool to Build

CHICAGO, Nov. 19—The Independent Pneumatic Tool Co., this city, manufacturer of Thor tools, will build an addition to its factory located in Aurora, Ill. The new structure will add 36,000 sq. ft. to present capacity.

October Employment Falls 1.4 Per Cent

WASHINGTON, Nov. 22—Employment in the automobile industry decreased 1.4 per cent in October, 1928, as compared with September, according to the Bureau of Labor Statistics, which remarked that this is the first time since November, 1927, that the industry has shown a decrease of more than 0.1 per cent. The total increase in automotive industrial employment from November, 1927, to September, 1928, was 53.3 per cent.

The statistics showed an increase of 1 per cent in employment and 4 per cent in payroll totals for 54 leading industries of the country. The statement was based upon reports from 17,220 establishments, employing 3,890,778 workers during October with wages totaling in one week $108,180,961.

Durant Sales Increase to 105,851 in 10 Months

NEW YORK, Nov. 19—Durant Motors produced and sold 105,851 cars during the past 10 months, according to announcement just made by T. S. Johnston, assistant to W. C. Durant. Mr. Johnston looks for a record year and points out that 1928 10 months' sales are 30.8 per cent above the total sales for the year 1927.

In order that all previous records may be broken, the Durant organization is calling upon its dealers to stage a special drive during November and December, setting as a quota 75 per cent of the total volume handled during September and October. If that quota is made, it is pointed out, all previous records will be broken.

Peerless Opens Coast Branch

CLEVELAND, Nov. 19—Peerless Motor Car Corp. has established a factory wholesale branch in Los Angeles to speed up deliveries on the Pacific Coast. The operation of the Los Angeles branch will be similar to the New York branch recently installed. Large stocks of cars and parts will be kept continuously on hand. A stock of cars also will be maintained in San Francisco.

Plane Engine Cowl Adds 30% to Power

WASHINGTON, Nov. 17—Development of a new form of cowling for radial air-cooled engines which adds more than 30 per cent to the effective horsepower for airplanes was announced this week by the National Advisory Committee for Aeronautics. The new device costs about $25 installed as standard equipment. It covers the entire engine but lets in enough air at the front to cool the cylinders. The dragging effect of the engine is reduced to 75 lb. at 100 m.p.h. as compared with 125 lb. with the engine uncovered.

Expect Air Mail in 1929 to Reach 3,000,000 lb.

WASHINGTON, Nov. 22—A total of 1,861,800 lb. of air mail were carried in postal planes during the fiscal year ending June 30, 1928, according to post office officials, as compared with 473,102 lb. during the fiscal year preceding. Every city of 200,000 or more population now has air mail service, it was announced and the mileage flown in the last fiscal year was more than 5,580,000.

Six pilots were killed and two passengers lost their lives when air mail planes crashed during the year while four pilots and two passengers were killed in 1927. Of the mail carried only 810 lb. were lost.

Postal officials expect that nearly 3,000,000 lb. of air mail will be carried in 1929, based on the 110 per cent increase in air mail business in the last three months due largely to the decrease in postal rates.

German Dealers Organize

BERLIN, Nov. 17—An association has been formed with headquarters at Berlin W. 57 Potsdamer-Strasse which is to comprise the intermediate and smaller motor vehicle and accessory dealers of all Germany.

Ohio October Sales Show Small Decline

COLUMBUS, Nov. 19—The Ohio Council, National Automobile Dealers Association, in a report covering the sale of new cars in October shows that a total of 8983 were sold in nine of the most populous counties of the state compared with 9196 in the same counties in September. This is a loss of 213 cars.

Sales compared with September were as follows: Cuyahoga county, containing Cleveland, 2591 against 2769 in September; Hamilton county, containing Cincinnati, 1440 against 1422; Summit county, containing Akron, 880 against 1049; Lucas county, containing Toledo, 842 against 947; Franklin county, containing Columbus, 1150 against 1010; Mahoning county, containing Youngstown, 595 against 560; Stark county, containing Canton, 581 in each of the months; Montgomery county, containing Dayton, 701 against 689; Scioto county, containing Portsmouth, 203 against 169.

Ford led in the nine counties with a total of 2423. Chevrolet was second with 1282; Essex third with 451; Buick fourth with 438; Pontiac fifth with 418, and Nash sixth with 416.

Timken Bearing Expansion Adds Third to Facilities

CANTON, OHIO, Nov. 17—Manufacturing facilities at the Timken Roller Bearing Co. will be increased virtually one-third through expansions started early last summer, which, when completed will have cost $6,000,000. Bearing output will be increased from 175,000 to more than 200,000 bearings daily, when the recently announced unit to the bearing factory is completed. Steel producing facilities at the plant have been increased 30,000 tons a month for open hearth and electric alloys.

With favorable weather the next six weeks, it is believed that the extension of the bearing factory and the installation of machinery to take care of increased production will be completed so that the new units will be in operation not later than the first of the year.

Calendar of Coming Events

SHOWS

Aeronautical Exposition, Coliseum, Chicago .....Dec. 1-9
All-American Aircraft Show, Detroit Board of Commerce, Detroit...Apr. 6-14
American Road Builders Association, Inc., Cleveland Auditorium..Jan. 14-18
Amsterdam Automobile Show...Jan. 11-20
Automobile Salon, Inc., Hotel Drake, Chicago .....Jan. 26-Feb. 2
Automobile Salon, Inc., Hotel Biltmore, Los Angeles.....Feb. 9-16
Automobile Salon, Inc., Hotel Commodore, New York .....Dec. 2-8
Automobile Salon, Inc., Palace Hotel, San Francisco .....Feb. 23-Mar. 2
Boston, Mass., Mechanics Bldg...March 2-9
Brussels .....Dec. 8-19
Buenos Aires .....Nov. 29-Dec. 9
*Chicago, National, Coliseum, Jan. 26-Feb. 2
Geneva Automobile Show.....Mar. 15-24
Melbourne Automobile Show .....May 2-11
*New York, National, Grand Central Palace .....Jan. 5-12
Rome Automobile Show....Jan. 30-Feb. 16
Western States Metal and Machinery Exposition, Los Angeles.....Jan. 14-18

* Will have special shop equipment exhibit.

CONVENTIONS

American Road Builders Ass'n, Inc., Cleveland Auditorium .....Jan. 14-18
American Society of Mechanical Engineers, Annual Meeting, 29 W. 39th Street, New York City.....Dec. 3-7
American Society for Steel Treating, Semi-Annual Meeting, Los Angeles .....Jan. 14-18
National Highway Traffic Assoc., New York City, 12 E. 53rd St.....Dec. 11-12
Chicago Power Exhibition and Conference, Coliseum, Chicago.....Feb. 12-16
International Air Conference, Washington .....Dec. 12-14
Chicago Aeronautical Assoc., Stevens Hotel, Chicago, Ill. .....Dec. 5-6
Manufacturers & Distributors of Motor Truck Equipment, Cleveland, Ohio .....Jan. 15
National Automobile Dealers Association, Palmer House, Chicago..Jan. 28-29
National Metal Congress, Los Angeles .....Jan. 14-18
National Research Council, Washington .....Dec. 13-14

S. A. E.

National

Chicago, Dec. 6-7—Aeronautic.
Detroit, Book-Cadillac, Jan. 15-18—Annual.
New York, Hotel Astor, Jan 10—Annual Dinner.